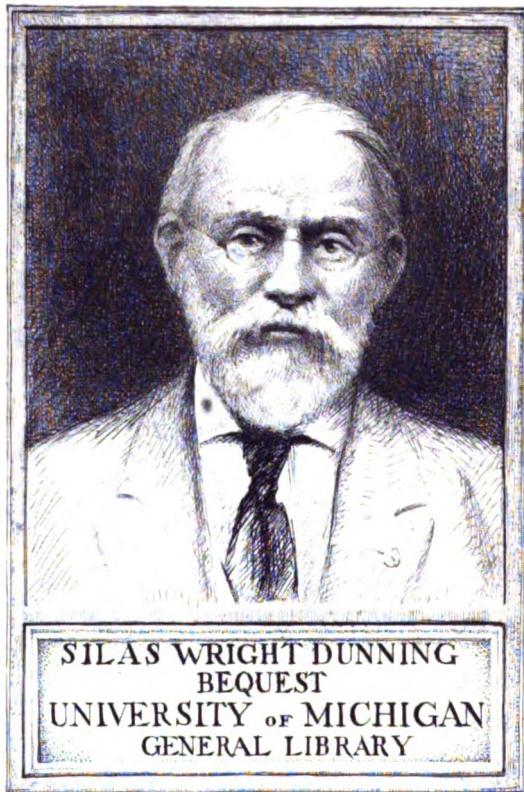

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

<https://books.google.com>



B 1,039,372



22
/

• 2256

Dunning
Napper
9-18-26
32691

CONTENTS.

Vol. VI., No. 26.

I.—European Foreign Soldiers in the British service in India, by Lieutenant Colonel F. B. Norman, 24th Regiment Punjab Native Infantry, (continued from No. 24)	1
II.—Narrative of the Expedition from India to Egypt in 1801, compiled from "The Life of Sir David Baird, the Memoirs of the Count de Noé," and the "Asiatic Annual Register," by Colonel Malleson, C.S.I.	53
III.—Notes of the History, Materiel, Organisation and Tactics of Artillery, by Captain E. H. H. Collen, (late R. A.) Assistant Secretary, Government of India, Military Department	67
IV.—Mounted Infantry, by M. Martin, Esq.	79

CORRESPONDING MEMBERS.

NAMES	CORPS.	STATIONS.
Major G. L. C. Merewether, R.E.	P. W. Department	Bombay.
Captain A. Battye	2nd Goorkhas	Dehra Doon.
Lieut. G. E. Churchill	...	Dhurmala.
Captain G. W. B. Collis	...	Roorkee.
Captain A. D. Butter	6th Royal Regiment	...
Major H. C. P. Rice	Brigade Major Eastern Frontier District	Shillong.
Major G. F. Graham	1st Sikhs	Kohát.
Lt.-Col. F. B. Norman	Station Staff	Barrackpore.
Capt. P. C. Story	24th Punjab N. I.	Jhansi.
Lieut. A. Howlett	Garrison Instructor	Sealkote.
Capt. F. B. Roberts	Sappers and Miners	Bangalore.
Major A. Kinloch	Royal Artillery	Cawnpore.
Colonel H. S. Obbard	Dy. Asst. Adj't. General for Musketry	Rawal Pindi.
Capt. J. F. Fitzgerald Cologan	41st Native Infantry	Morar.
Capt. A. Crookshank	Station Staff Officer	Moradabad.
Surgeon Evatt	Military Dept.	Calcutta.
Lieut. R. C. Temple	Army Medical Dept.	Fyzabad
Capt. J. A. S. Colquhoun	1-21st Fusiliers	Rangoon and Burmah.
Colonel E. W. E. Walker R.A.	Commissary of Ordnance	Peshawar.
	...	Dalhousie.

Corresponding Members leaving stations are requested to ask some other member to take up the duties, merely reporting the same to the Secretary.

C O N T E N T S .

Vol. VI., No. 27.

I.—Notes on the History, Material, Organisation and Tactics of Artillery, by Captain E. H. H. Collen (late R. A.) Assistant Secretary, Government of India, Military Department (continued from No. 26) ...	85
II.—Notes on a Native Army Hospital Corps for India, by Surgeon Major G. J. H. Evatt, M. D., Army Medical Department. ...	107
III.—The cause of Drunkenness in our Army and the best mode of suppressing it, Essay by Surgeon Major G. J. H. Evatt, Army Medical Department ...	125

CORRESPONDING MEMBERS.

NAMES	CORPS.	STATIONS.
Captain A. Battye	2nd Goorkhas	Dehra Doon.
Captain G. W. B. Collis	6th Royal Regiment	Roorkee.
Captain A. D. Butter	Brigade Major Eastern Frontier District	Shillong.
Major H. C. P. Rice	1st Sikhs	Kohát.
Major G. F. Graham	Station Staff	Barrackpore.
Lt.-Col. F. B. Norman	24th Punjab N. L.	Jhansi.
Capt. P. C. Story	Garrison Instructor	Sealkote.
Lieut. A. Howlett	Sappers and Miners	Bangalore.
Capt. F. B. Roberts	Royal Artillery	Cawnpore.
Major A. Kinloch	Dy. Asst. Adjt. General for Musketry	Meean Meer
Colonel H. S. Obbard	41st Native Infantry	Morar.
Capt. J. F. Fitzgerald Cologan	Station Staff Officer	Moradabad.
Capt. A. Crookshank	Military Dept.	Calcutta.
Surgeon Major Evatt	Army Medical Dept.	Fyzabad
Lieut. R. C. Temple	1-21st Fusiliers	Rangoon and Burmah.
Capt. J. A. S. Colquhoun	Commissary of Ordnance	Peshawar.
Colonel E. W. E. Walker R.A.	... Marine Battalion	Dalhousie.
Captain Becke	...	Bombay.

Corresponding Members leaving stations are requested to ask some other member to take up the duties, merely reporting the same to the Secretary.

C O N T E N T S .

Vol. VI., No. 28.

I.—Notes on the History, Materiel, Organisation and Tactics of Artillery, by Captain E. H. H. Collen, (late R. A.) Assistant Secretary, Government of India, Military Department (continued from No. 27) ...	149
II.—Notes on Turkey in Asia, by Captain A. Dunlop Anderson, 23rd Punjab Pioneers ...	173
III.—Strategic Cavalry Manoeuvres, by Captain R. Elias, 59th Regiment ..	199
IV.—"Limbers and Wagons," by Major W. B. E. Ellis, R. A. ...	203
V.—Burmah from a Military point of view, by E. G. B. ...	205
VI.—Rustchuk, translated from No. 132. <i>Russian Invalid</i> , by Lieut. F. N. Maude, R. E. ...	223
VII.—Translation from the "Invalid Russe," No. 120, 6th June 1877, present state of Entrenched Camp of Kars, translated by Lieut. F. N. Maude, R. E. ...	225
VIII.—The Natural Lines of Defence of European Turkey, translated from Nos. 37 and 39, (published 9th and 16th May 1877) of the "Militär Wochenblatt," by Captain R. Elias, 59th Regiment ...	233
IX.—Catalogue of works on Cavalry, by Lieutenant G. H. Elliott, 3rd Bengal Cavalry ...	247

CORRESPONDING MEMBERS.

NAMES	CORPS.	
Captain A. Battye	2nd Goorkhas	Dehra Doon,
Major A. D. Butter	24th N. I.	Shillong.
Major H. C. P. Rice	1st Sikhs	Kohāt.
Lt.-Col. F. B. Norman	23rd Punjab N. L.	Jhansi.
Capt. F. C. Story	Garrison Instructor	Sealkote,
Lieut. A. Howlett	Sappers and Miners	Bangalore,
Capt. F. B. Roberts	Royal Artillery	Cawnpore.
Colonel H. S. Obbard	41st Native Infantry	Morar.
Capt. J. F. Fitzgerald Cologan	Station Staff Officer	Barrackpore,
Surgeon Major Evatt	Army Medical Dept.	Fyzabad
Lieut. R. C. Temple	1-21st Fusiliers	Rangoon and Burmah.
Capt. J. A. S. Colquhoun	Commissary of Ordnance	Peshawar.
Colonel E. W. E. Walker R.A.	...	Dallhousie,
Captain Becke	Marine Battalion	Bombay.
Captain Elias	59th Regiment	Dagshai.

Corresponding Members leaving stations are requested to ask some other member to take up the duties, merely reporting the same to the Secretary.

C O N T E N T S .

Vol. VI., No. 29.

I.—Notes on the History, Materiel, Organization, and Tactics of Artillery, by Captain E. H. H. Collen, Assistant Secretary Government of India, Military Department, (Continued from No. 28.)	251
II.—Persia, its Physical Geography and People, a Lecture delivered by Major O. B. St. John, R. E., at Simla, on the 12th July 1877	273
III.—The Armament of Cavalry, by Lieutenant G. H. Elliot, Adjutant, 3rd Bengal Cavalry	297
IV.—Notes on Professional Training, by Captain G. Logan, Wing Officer, 7th Bengal Infantry	321
V.—The Russo-Turkish War of 1877 in Asia Minor, (Trans- lated from the "Militar Wochenblatt" No. 54,) by Captain R. Elias, 59th Regiment	323
VI.—Observations on the instruction of the German Army, by Colonel Baron Kaulbars, from the Revue d'Etranger No. 361, Cavalry—Instruction of Squadrons, Trans- lated by Major Sanford, R. E.	347

CORRESPONDING MEMBERS.

NAMES	CORPS.	STATIONS.
Major A. Battye	2nd Goorkhas	Dehra Doon.
Major H. C. P. Rice	1st Sikhs	Kohát.
Lt.-Col. F. B. Norman	24th Punjab N. I.	Jhansi.
Capt. P. C. Story	Garrison Instructor	Sealkote.
Lieut. A. Howlett	Sappers and Miners	Bangalore.
Capt. F. B. Roberts	Royal Artillery	Delhi.
Colonel H. S. Obbard	41st Native Infantry	Morar.
Major J. F. Fitzgerald Cologan	Station Staff Officer	Barrackpore.
Surgeon Major Evatt	Army Medical Dept.	Fyzabad
Lieut. R. C. Temple	1-21st Fusiliers	Rangoon and Burmah.
Capt. J. A. S. Colquhoun	Commissary of Ordnance	Peshawar.
Colonel E. W. E. Walker R.A.		Dalhousie.
Captain Becke	Marine Battalion	Bombay.
Captain Elias	59th Regiment	Dagshai.

Corresponding Members leaving stations are requested to ask some other member to take up the duties, merely reporting the same to the Secretary.

NOTICE.

UNITED SERVICE INSTITUTION OF INDIA.

An Exhibition of Military Drawings will be held at Simla during September 1877. All drawings intended for competition, to be with the Secretary by the 15th September. The first prize will be of the value of Rupees 100—and the second prize of the value of Rupees 50.

All officers in India whether members of the Institution or not are eligible to compete for the above prizes.

The Drawings to consist of Military Sketches of ground, executed in the manner taught at the Garrison Instruction classes throughout India.

The first prize will not be awarded for a copy.

Two additional prizes of the value of 70 and 30 rupees respectively are also offered for competition to all Non-Commissioned officers and privates of Artillery, Cavalry, and Infantry, doing duty with their regiments in India. The conditions the same as for the officers prizes.

The prizes will be awarded by a Committee of the Council.

Drawings for competition may be sent either framed or unframed.

By order of the Council,

H. H. STANFELD, LIEUT.-COL.,

Secretary *United Service Institution of India.*

SIMLA,

17th March 1877.

N O T I C E .

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1877.

Members can pay their subscription to the Alliance Bank, Simla, if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton as they desire.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV and V to any member wishing for the same.

H. H. STANSFIELD, LIEUT.-COLONEL,
Secretary.

ORIGINAL PAPERS.

I.

EUROPEAN FOREIGN SOLDIERS IN THE BRITISH SERVICE IN INDIA.

BY

LIEUTENANT COLONEL F. B. NORMAN,

24th Regiment Punjab Native Infantry, (continued from No. 24.)

CORRECTIONS :—At page 107, for "Surgeon G. J. H. Evatt" please read Surgeon Major G. J. H. Evatt.
At page 124 for "George T. H. Evatt" read George J. H. Evatt and at page 125 for "Surgeon Major T. H. Evatt" read Surgeon Major G. J. H. Evatt.

Accordingly, in concert with the mutineers, a general attack on the fortification was sent against Gheriah one of his strongholds. The place fell on the 13th February 1756, and the booty amounting to ten lakhs, was divided by the British Forces, without admitting the allies to any participation. Nothing further remaining to be done on the Western Coast, Clive proceeded to Fort St. David of which place he had been appointed Deputy Governor, and arrived there on the 20th June the very day in which the Nawab of Bengal captured Calcutta.*

* Whilst at Bombay, after the capture of Gheriah, Clive became involved in a dispute with the Government of that Presidency. The circumstances of the case were as follows :—a Captain de Funck, a Swede, a man of great ability who had entered the Company's service as an Engineer, was ordered by the Governor and Council to be tried by Court Martial and they appointed Major Sir James Fontis, Bart, who Commanded the troops on the Bombay establishment, President of the Court. On hearing this Clive wrote asserting that it was his right, and not that of the President

When Clive left Bombay the number of regular troops in the island was 1571, of these 986 were Europeans comprising as well as English, Germans, Dutch, Swedes and a few Swiss, the remainder were Topasses.

From a very early period the European force maintained in Bengal was largely composed of Dutch, and when in May 1756 the Nawab Suraj-u-Dowlah invested the factory at Cossimbazar the Garrison consisted of 22 Europeans, mostly Dutch,* and 20 Topasses. The regular force of the Presidency consisted of four Companies of Infantry and one of Artillery, a considerable portion of these troops however, were detached at the out stations of Dacca, Balasore, and Jugdeah, so that when the Nawab advanced against Calcutta, the number of regular troops available for its defence amounted to no more than 264 men, and of these a portion were Topasses. In addition to the regular troops, there were two companies of Militia,† composed of the Company's servants together with the European, Indo-Portuguese and Armenian inhabitants amounting to 250 more, making a total of 514 men of whom only 174 were Englishmen.

Tidings of the surrender of Cossimbazar reached Madras on the 15th July, and on the 20th, a detachment of 250 men, mostly Europeans, sailed for Bengal under the Command of Major Kilpatrick. Intelligence of the capture of Calcutta was not received until the 16th August; and on the 18th, Clive was summoned to the Presidency, it being in contemplation, in consequence of the state of Colonel Lawrence's health, that he should proceed in command of the expedition destined to recover Calcutta, and re-establish the Company's affairs in Bengal.

Letters from England dated in August of the preceding year, had brought information that war with France was inevitable, and moreover

and Council to direct the assembly of the Court, but at the same time stated, that he would have acquiesced in the decision of the Council, if they had appointed him President of the Court. His protest was answered by the Secretary to Government who said, that while the Governor and Council fully acknowledged the respect due to His Majesty's Commission, they considered they were at liberty to choose whether they should avail themselves of Colonel Clive's services or not, and that his rank as Commander-in-Chief had been conferred upon him for a special purpose, and had no effect when that service had been performed and he was without employment, and after assuring him that the Government of Bombay had no wish to insult him, concluded by saying that the correspondence would be forwarded for the orders of the Court of Directors. Captain de Funck was acquitted, and resumed the superintendence of the construction of the fortifications of Bombay, but towards the end of the following year, Major Mace, late of the King's Artillery, touched at Bombay with a Commission from the East India Company as Engineer General of all their Garrisons in the East Indies, and Captain de Funck looking upon Major Mace's appointment as a disgrace to himself, resigned the Company's service in disgust. Major Mace was accordingly detained at Bombay, although he was urgently required in Bengal, to relieve Captain Brohier who was building the present Fort William, but the state of whose health necessitated that he should shortly sail for England.

* Orme Vol. 2. p. 57.

† The Militia was first raised during the Mahratta invasion of Bengal in 1742.

stated that the French were preparing to send a fleet of 19 vessels of war, and a military force of 3000 regular troops from Brest to Pondicherry. The number of troops that could be spared from Madras became therefore a matter for serious consideration. At last, after much discussion, it was decided to send the fleet under Admiral Watson together with a military force under Clive to recover Calcutta and restore the English interests and position in Bengal. After effecting which they were to return to Madras, where it was hoped that they would arrive before the French reinforcements could reach Pondicherry.

The naval portion of the expedition consisted of five of His Majesty's ships and five of the Company's, together with a fire vessel. The troops amounted to 900 Europeans and 1200 Sepoys, the 39th regiment furnishing 250 of the former, the remainder, with the exception of 80 Artillerymen, belonging to the Madras European Battalion. On the 16th October the expedition sailed from Madras, and on the 20th December all the vessels, with the exception of His Majesty's ship Cumberland, and the company's ship Marlborough, had arrived at Fultah. The non arrival of these two ships greatly impaired the efficiency of the expedition, as there were about 300 Europeans on board the Cumberland, and the greater portion of the Field Artillery and military stores had been shipped on board the Marlborough.

The expedition left Fultah on the 27th December, and having captured the Fort of Budge Budge, anchored on the 1st January 1757 off the Forts of Tannah and Asighur which were abandoned by the enemy without firing a shot, although together they mounted fifty guns. The next day, after a feeble resistance the English were again in possession of Calcutta. Still further to impress the Nawab with the power of the English, the town and Fort of Hooghly were on the 11th of the same month taken possession of by a naval and military force under Major Kilpatrick.*

Whilst the expedition under Major Kilpatrick was absent from Calcutta, news arrived from Europe, by way of Aleppo, that war had been declared between Great Britain and France. The French at this time were believed to have 300 Europeans and a good train of artillery at Chandernagore, and it was not unreasonable to suppose that they would join the Nawab, with whom the English thought they would then be unable to cope. It was therefore considered adviseable to enter into negotiations with the Nawab, but on the news of the capture of Hoogly reaching him, he was so exasperated, that he at once set out with a large force for Calcutta. The French most unwisely decided not to join the Nawab, and proposed to the Council at Calcutta that they should enter into a treaty to abstain from hostilities in Bengal, during the continuance of the war in Europe. The Council were willing to

* The despatches relating to the recovery of Calcutta and the reduction of Hoogly, were taken to England by Captain Richard King of the Royal Navy in a sloop of 60 tons.

consent to the treaty, but Admiral Watson refused his concurrence, as it appeared that it would not be considered binding by the authorities at Pondicherry, whereas the Council at Calcutta could act without reference to Madras.

At the end of the month, the Marlborough, which had been so long missing, arrived with the Field Artillery. The force at Calcutta now amounted to 700 European Infantry, 100 Artillery and 1500 Sepoys with 14 Field pieces.

On the 3rd February, the Nawab reached Calcutta and Clive having ascertained that all his Artillery had not arrived, determined to attack his camp early the following morning. Having been reinforced by 600 sailors* from the fleet, the English marched from their camp at 3 a. m. and before dawn came upon the enemy's advanced guards who, after discharging their matchlocks ran away. The English continued to advance, but a heavy fog coming on, the troops—although they behaved with the greatest gallantry—got confused, and at noon Clive withdrew them to the Fort. The loss in this affair was heavy, being 3 officers killed, 97 European soldiers, 24 sailors and 53 sepoys killed and wounded. That of the enemy was still heavier, amounting to 600, including 22 of the principal officers. The next day the Nawab sent to complain of the attack upon his camp, at the same time making overtures for peace, and on the 9th February a treaty was concluded, by which all their former privileges were restored to the English and permission given to fortify Calcutta.

During the first week in March, official information reached Bengal of war having been declared between Great Britain and France. At the same time a reinforcement of 300 men arrived in the river from Bombay, of whom 100 were Malabar Topasses, and news was received that the Cumberland with 90 of the 39th regiment had arrived at Balasore.†

Letters also were received from the Council at Madras urging Clive to return with the troops belonging to that Presidency, in fulfilment of the understanding upon which the expedition had been sent

* As it had been impossible to procure bullocks for the guns they were dragged by sailors, and the ammunition was carried by the lascars, on their heads. There was at this time only one horse in the Camp and town, and this had been brought from Madras.

† The Cumberland bearing the flag of Rear Admiral Pococke, whilst on the voyage from Madras to Calcutta had struck on a sand bank off Point Palmyrus, but was got off again without having sustained any serious damage. After having tried in vain for ten days against the wind and currents to get round the Point, and the sick on board amounting to 266, the Admiral bore away for Vizigapatam for refreshment. On his arrival he found the settlement in fear of being attacked by M. Bussy, he therefore landed 90 men of the Company's troops as reinforcement for the garrison, and as the wind and currents were still adverse, he sailed for Madras, here, at the request of the Governor he landed 100 more men, receiving on board the same number of sailors who had recovered in hospital. The Admiral then again sailed for Bengal, and arrived at Balasore during the first week in March.

to Bengal. Clive however, had information that on the very day he had signed the treaty, the Nawab had written soliciting aid from M. Bussy who at the head of a considerable force was in the Northern Circars at a distance of not more than 300 miles from Calcutta. He therefore determined to remain in Bengal, considering that the position of the English in that province would be seriously imperilled, should the Nawab be joined by the force under M. Bussy, as well as by the troops at Chandernagore.

The settlement of Chandernagore consisted of two distinct towns, one inhabited by the Europeans and the other by the natives, and a Fort. The French Territory, commencing from the Southern boundary of the Dutch settlement at Chinsura, extended two miles along the river, and for about a mile and a half inland. The Fort was situated nearly midway between the northern and southern limits of this territory, and at a distance of 30 yards from the river. It was a square of about 130 yards, with a Bastion mounting 10 guns at each angle, there was also a Ravelin armed with 8 guns on the edge of the river covering the gateway on the eastern, or river face. Guns were also placed in different parts of the Curtains. These were all heavy pieces being either 24 or 32 pounders. In addition 6 light pieces were planted on the roof of the church inside the Fort and overlooking its walls. As soon as news of the declaration of war had been received, the French began to dig a ditch round the Fort and to demolish all buildings which were within 100 yards of its walls, using the débris to construct a glacis, but neither the ditch nor the glacis were completed. To supply these defects they had erected several Batteries beyond the foot of the glacis; one of 3 guns before the gate leading to Chinsura; another of 4, on a road leading from the westward to the southern face of the Fort; to the southward they had four Batteries, three of which were in the principal streets leading to the Fort, and the other close to the river about 150 yards south of the Fort Commanding the narrow channel through which ships had to pass to get abreast of the Fort.

The garrison consisted of 600 Europeans and 300 Sepoys but only one half of the former were soldiers, the remainder being the European inhabitants of the place and the crews of the ships lying off the Fort.* They had however strong grounds for hoping that they would receive assistance from the Nawab.

Deeming the force under his Command, with the aid of the fleet, sufficiently strong to take Chandernagore even should the garrison be aided by the Nawab, Clive in conjunction with Admiral Watson at once commenced preparations for attacking that place. On the 7th

* These are the numbers given by Orme Vol 2, p. 141, but according to the French accounts the garrison consisted of 300 European and 300 Sepoys, and Colonel Malleson has pointed out, that M. Renault de St. Germani the Director General of Chandernagore in the official despatch sent by him to Count Lally gives the number of European soldiers as 146 of whom 45 were invalids. The remainder of the Europeans were the sailors from the ships, and the inhabitants of the place.

March, the troops broke up their encampment opposite Calcutta, and commenced to move slowly towards Chandernagore so that the Detachment from Bombay might have time to join before they entered the French Territory.

Having been joined by the troops from Bombay, Clive on the evening of the 13th summoned the garrison to surrender, but received no reply. The next day he commenced hostilities. In order to avoid the fire of the Batteries in the southern part of the town, the troops entered the French Territory from the high road leading to the north face of the Fort ; on this road was situated the 4 gun Battery before mentioned. Strong detachments from the garrison availing themselves of their local knowledge and of the cover afforded by thickets and detached buildings, skirmished with the English without however inflicting any material loss until 3 p. m., when they were compelled to take refuge in the 4 gun Battery. The English then took possession of the houses adjacent to this Battery and kept up so hot a fire upon it, that during the night, the French spiked the guns and abandoned it. The possession of this Field work by the English rendered the four Batteries which had been erected to the south of the town untenable as they were now liable to be taken in reverse, to avoid which, the guns and Detachments were withdrawn from them before day break of the following day. On the 15th the English established themselves in the town and buildings in the southern esplanade. The 16th was occupied in bringing up the Artillery and stores, and on the 17th a heavy fire was opened on the Fort from the tops of houses, and shells were thrown in from some evéhours and a brass 13 inch mortar. The fire was resumed on the 18th and a Battery for five 24 pounder guns was commenced in rear of some ruins opposite the south face of the south-east Bastion. The deserted Battery on the side of the river was also occupied and prepared for three 24 pounder guns, which on the 19th opened on the south flank and face of the north-east Bastion.

On this day H. M. ships Kent, Tiger and Salisbury anchored about a mile below the Fort. Immediately above where they anchored, was a large sand bank, which made the channel very narrow, and the width of this, the enemy had still further reduced, by sinking in it four ships laden with ballast ; its passage moreover was commanded by the guns of the Fort. Above the sand bank three other ships lay at anchor, and these it was said had been prepared as fire ships. Admiral Watson therefore determined to anticipate their employment, and at night sent all the boats of the fleet to cut them adrift. This was done, and they drifted upon the sands, their crews had however been previously taken out to reinforce the garrison.

The Nawab, on hearing of the proceedings of the English sent many letters, six arriving in one day, desiring them in imperious and menacing terms to discontinue hostilities. For this reason it was most desirable that the attack on the Fort should be made without delay, but unfortunately the tides did not serve. The Admiral was therefore compelled to postpone operations for two or three days.

He took advantage of this delay to obtain information regarding the channel, and with this object sent Lieutenant Hey with a flag of truce, demanding the surrender of the Fort, a demand with which the Governor politely but resolutely refused to comply. Lieutenant Hey in passing the sunken vessels carefully observed their position. The next day Mr. John Delanotte, the master of the Kent was sent to sound all round them, this duty he gallantly accomplished under a heavy fire, and ascertained that there was room for one vessel at a time to pass. This had previously been reported to be the case by M. Terraneau,* an officer in the French service, who had recently deserted to Clive, to whom he rendered considerable service during the seige.

In the meanwhile the operations on land had been carried on with vigour. On the 20th however, the 3 gun Battery on the river side had been silenced by the fire of the north and south-east Bastions ; and on the 21st the fire from the Fort brought down a house close to the 5 gun Battery, injuring several men and retarding its completion. It was however finished and the guns placed in position on the evening of the 22nd. By which time the river side Battery had also been repaired, and guns mounted again in it.

On the 22nd, all being ready, it was decided to make a combined attack on the following morning. Early in the night, the Admiral caused lights with blinds towards the Fort, to be placed on the masts of the sunken vessels, so that the ships might be able to pass between them before day light without being seen from the Fort.

The positions assigned to the ships were as follows :—the Tiger of 60 guns, bearing the flag of Admiral Pococke,† opposite the north-east Bastion ; the Kent of 64 guns Admiral Watson's flag ship abreast the Curtain and Ravelin in front of the gateway ; and the Salisbury of 50 guns opposite the south-east Bastion.

Early on the morning of the 23rd March, the ships all got under weigh ; at the same time a heavy fire was opened on the south-east

* M. Raymond has appended the following note regarding M. Terraneau to his Translation of the Seir Mutakherin.—“ This man, who had some merit, having made “ money in the English Service, sent a few years after a supply to his father in France, “ promising to take care of him henceforward. The old man returned the money, “ with a letter, in which he protested against holding any correspondence with a “ traitor to his country ; and the son, in despair at the style of the letter, hanged “ himself at his own door, with his own handkerchief. He was a tall, stout man, who “ having lost his right arm by a cannon ball had found means to write legibly “ with the left, and what is more, to write a pamphlet on Artillery in good English. “ The officers at first would not admit him in their Corps, but the Colonel remonstrat- “ ed, and he observed, that his word was engaged to the man on that article, and that “ a failure on his part would preclude any further desertions.”

† On his arrival at Balasore in the Cumberland, Admiral Pococke heard of the intended attack upon Chandernagore, and finding that he could not get his ship up the river in time, he joined the squadron under Admiral Watson in his barge, on the 21st, and the next evening hoisted his flag on board the Tiger ; “ his arrival,” says Iver, “ was very mortifying to the gallant Captain Latham, who was obliged to yield “ to his superior officer a great part of those honours which otherwise would have been “ solely due to him as commander of the Tiger.”

Bastion from the newly constructed 5 gun Battery. The Tiger was the leading ship, and in passing the Ravelin fired a broadside which compelled the enemy to abandon that work, proceeding on, she anchored at six o'clock off the north-east Bastion at a distance of 50 yards. The Kent quickly followed, but before she could reach her station the ebb-tide had set in, and just as she was in the act of anchoring, the fire from the Fort killed several of the sailors who were working the ship, and disabled the Commander, Captain Speke. So much confusion ensued that the cable was not stopped in time, and ran out its full length, so that instead of being anchored opposite the Ravelin, she drifted down stream so far, that her poop appeared beyond the south-east Bastion and was exposed to the fire of the guns in the flank of the south-west Bastion. Owing to this mischance the Salisbury was not able to take part in the attack.

The action now became general, and was fiercely maintained on both sides. The flank guns of the south-west Bastion galled the Kent so severely, that Admiral Watson ordered the guns on the lower deck to be brought to bear upon it, and it was soon afterwards silenced. At about eight o'clock, a shot from the Fort entered the Kent near the fore mast, and ignited two or three 32 pounder cartridges, which by their explosion set fire to the wad nets and other loose articles, and filled the whole ship with smoke. A cry was raised that the ship was on fire in the gunner's store room, this caused a panic among the greater part of the crew, and 70 and 80 men jumped from the port holes into the boats which were alongside. The French perceiving the confusion, and resolving to profit by it, kept up as hot a fire as they could. Lieutenant Brereton however, with the aid of a few brave men succeeded in extinguishing the fire, and running to the ports urged the men in the boats to return, upbraiding them for deserting their quarters ; but finding that this had no effect upon them, he thought the more certain method of succeeding would be to strike them with a sense of shame, and therefore loudly exclaimed. "*Are you Britons ! You Englishmen and fly from danger ! For shame for shame !*" This reproach had the desired effect ; to a man they immediately returned to the ship, and going to their quarters, renewed a spirited fire on the enemy.

At 9 o'clock their Batteries having been nearly all silenced and the parapets destroyed, the French hung out the white flag. Admiral Watson in order that the enemy might not see the condition of his ship, sent Captain Coote of H. M. 39th Regiment and Lieutenant Breton—the only Commissioned officer on board the Kent who was not killed or wounded—* with a flag of truce to the Fort, to arrange terms. At about 3 o'clock in the afternoon the capitulation was finally concluded, and the British took possession of the place.

Whilst the terms of surrender were under discussion, some 50 of the best soldiers of the garrison together with 20 Topasses quitted the

* Ives p. 129.

Fort and marching to the northward joined M. Law, the Chief of the French factory at Cossimbazar.

The loss of the French in this spirited defence was computed at 50 Europeans killed and double that number wounded.* The casualties in the two English ships were very heavy, amounting to 4 officers killed and 10 wounded, amongst the latter was Admiral Pococke; of the sailors and marines 51 were killed and 115 wounded, the greater number of casualties were on board the Kent. This ship had three of her guns on the lower deck dismounted, 6 shot in her masts and 142 in her hull, besides much damage done to the rigging. The loss of the troops was comparatively trifling, amounting during the whole siege to about 40 killed and wounded.

The terms of capitulation proposed to Admiral Watson contained nine articles. The 1st was—"The lives of the deserters shall be saved"†—to this the Admiral replied—"The deserters shall be absolutely given up"—The 3rd—"The soldiers of the garrison shall be prisoners of war, so long as the present war continues, and when peace is made between the King of France and the King of England, they shall be sent to Pondicherry, and till then shall be entertained at the expense of the English Company"—The Admiral replied,—"The Admiral likewise agrees with this difference only, that instead of sending the soldiers to Pondicherry, they shall be sent to Madras or England as the Admiral shall hereafter think proper; and that such foreigners who are not of the French nation, and chose voluntarily to enter into the English service shall have liberty."

Although greatly exasperated against the English, the Nawab was compelled to temporise, as he had received intelligence that Ahmed Shah Abdalli meditated an expedition against Bengal for the purpose of calling the Governors to account for many years of revenue due to the Imperial treasury. Dissembling his anger, he wrote congratulatory letters to Admiral Watson and Colonel Clive, but at the same time ordered a large division of his Army under Roy Doolut Ram, to encamp at Plassey 30 miles south of Cossimbazar, and it was evident that he

* Mr. Edward Ives who was present at the attack as surgeon of the Kent writes as follows in his narrative :—" It must be acknowledged that the French made a gallant defence, for they stood to their guns as long as they had any to fire. We never could learn how many of their men were killed or wounded in the whole; though they confessed that they had forty carried off dead from the S. E. bastion. The north-east bastion was also cleared of its defenders twice." The Director General of the settlement M. Renault de St. Germain displayed great courage and determination. The chief merit of the defence however was due to M. Vigne commander of the French company's ship " Saint Contest" he was entrusted with the defence of the Bastions and directed their fire with great skill and judgment.

+ The number of men who had deserted to the French is not given; but Ives mentions, that amongst the defenders of the north-east Bastion, was one Lee, a corporal and deserter from the Tiger, who pledged himself to throw two shells out of every three into that ship; while he was bringing the mortars to bear for this purpose he was wounded by a musket ball from the Kent's top. He was afterwards sent home a prisoner to England.

meditated the destruction of the English whenever opportunity should offer. Under these circumstances Clive, notwithstanding the remonstrances from Madras, determined to remain in Bengal, convinced that the Nawab would never fulfil the treaty of February unless constrained by fear.

The ships after the capture of Chandernagore had returned to Calcutta, where the Kent, which was an old ship and had suffered much in the action, was condemned. The troops however, moved to Hooghly and encamped on the plain to the north of the town, where they were in a good position either to act against, or awe the Nawab. The number of troops in camp and garrison now amounted to 1100 Europeans, including Artillery and Topasses, and about 2000 sepoys, many of the prisoners taken at Chandernagore, amongst whom were some Dutch and Germans, as well as French, having taken service in the Company's European Battalion, as did also some of the sailors of the Kent, when that vessel was condemned, of the latter however it would appear that the greater number entered the Artillery.*

In the meanwhile a formidable conspiracy had been formed against the Nawab, the chief conspirator being Meer Jaffier Khan the Pay Master and Commander-in-Chief of his Army. The conspirators feeling that without the assistance of the English they had but little chance of success, opened a communication with the Council at Calcutta. It was with the greatest hesitation that the Council entered upon the consideration of the proposals submitted to them, but convinced that the Nawab was the inveterate enemy of the English, and that he would seize the first opportunity for annihilating their power in Bengal, they at last determined to join the confederacy. A secret treaty was therefore signed on the 1st May 1757, by which the English agreed to place Meer Jaffier on the throne, he undertaking to pay full compensation for all previous losses, private as well as public, and to amply reward the Company, and all concerned, for present risks and contemplated services.

At the suggestion of Meer Jaffier the camp at Hooghly was broken up, one half of the troops being sent to Calcutta and the remainder to Chandernagore. Clive then wrote to the Nawab telling him what he had done, and asking him as a proof of friendship to recall the force at Plassey. The Nawab who was now relieved from all dread of an Afghan invasion, and moreover was in communication with M. Bussy, considered it unnecessary to temporise any longer with the English instead therefore of withdrawing his troops from Plassey, he ordered Meer Jaffier to join Roy Doolut Ram with 15,000 additional men.

Meer Jaffier now earnestly recommended that the British troops should take the field. Accordingly, on the 12th June, the troops at Calcutta together with 150 sailors moved up to Chandernagore ; the sick Europeans together with some Topasses and sepoys being left to

* Broome p. 119.

guard the French prisoners, and a few artillery men to look after the guns in the Fort. Leaving for the defence of Chandernagore, 100 sailors, a few sepoys and the sick of the Detachment which had been stationed there. The force available for the field left Chandernagore on the 13th. The Europeans with all the field pieces, ammunition and stores, having been embarked in 200 boats which were towed against the stream by their crews, the sepoys marching along the bank in sight of the boats.

On the 17th and 18th, a Detachment which had been sent forward under Major Eyre Coote* took possession after a slight show of resistance of the town and Fort of Cutwah situated on the west bank of the Cossimbazar river, about 18 miles above its junction with the Jellingee. Within the Fort and in the neighbourhood was found an immense quantity of grain, together with a large supply of military stores and ammunition, and 14 pieces of cannon. On the evening of the 18th the main body of the army arrived and encamped on the plain ; but the next day, the rainy season commenced with such violence, that the troops had to strike their tents, and seek shelter in the huts and houses in the Fort and town.

As soon as the army had left Chandernagore Clive dismissed two of the Nawab's messengers who were in his camp, with a letter to the following effect :—“ That the Nawab had used every subterfuge to “ evade the fulfilment of the treaty of February ; that in four months “ he had only restored a fifth part of the property he had plundered “ from the English ; that he had scarcely made peace before he had invited M. Bussy to come from the Deccan, and assist him in extirpating them once more out of his dominion ; and that at this very time “ a party of French troops under M. Law were maintained at his expense “ at a distance of not more than 100 miles from his capital.” Further that on groundless suspicion, he had insulted the English honour, at one time sending troops to examine their factory at Cossimbazar ; at another driving their Vakeel with disgrace out of his presence ; and that seeing no other remedy their army was now marching to Moorshedabad where it was intended to refer the complaints of the English to the principal officers of his Government, amongst whom were named Meer Jaffier Khan and the Seths, to which arbitration it was hoped that he would acquiesce and spare the effusion of blood.

In the meanwhile the Nawab who had some suspicion of the conspiracy which had been formed against him, had been making overtures to Meer Jaffier Khan, from whom he had been for some time estranged, and with such apparent success, that on the 15th they were formally reconciled, an agreement sanctified by mutual oaths on the Koran was entered into, Meer Jaffier promising not to join or give any aid to the

* After the capture of Chandernagore, Captains Archibald Grant, and Eyre Coote of the 39th Regiment had been promoted to the local rank of Major.

English in the impending contest, and the Nawab, to permit him, as soon as peace should be restored, to retire unmolested out of his province with his family and treasure.

Elated with this reconciliation, the Nawab,—who had not as yet received the letter Clive had given to his messenger after the English troops had left Chandernagore—wrote in terms of defiance to Clive ; “ Suspicion,” he said, “ that some trick was intended had been the real cause which had induced him to keep his army so long at Plassey ; but God and the Prophet would punish those by whom the treaty was violated.” At the same time he ordered his whole army, which included the troops under Meer Jaffier, to assemble at Plassey.

While the Nawab had been temporising with Clive, he had furnished M. Law the chief of the French factory at Cossimbazar with money, arms, and ammunition, and desired him to march slowly towards Bahar, but to be prepared for an early summons to return to Moorshe-dabad. Accordingly on the 16th April, M. Law with 100 Europeans and 60 Coromandel Sepoys had set out for Bahar. The Nawab now sent orders to M. Law who was at Bhagulpore, to come to his assistance with the utmost expedition.

Clive since leaving Chandernagore had written every day to Meer Jaffier, but had only received one letter in return, and this had reached him on the 17th and was dated the day before. In it, Meer Jaffier acknowledged his reconciliation with the Nawab, and having taken an oath not to assist the English, but said, that nevertheless, his agreement with them must be carried out. This ambiguous communication caused Clive to suspect that he might betray the English, by combining with the Nawab, and he therefore determined not to cross the Cossimbazar river until all doubts should be removed. It was not until the evening of the 20th that he again heard from Meer Jaffier, in this letter Meer Jaffier, merely said that he should commence his march from the city on the 19th, the day on which the letter was written, and that his tent would either be on the left or right of the Army from whence he promised to send more explicit intelligence, but neither explained his own plans, nor proposed any for the adoption of the English.

In this state of uncertainty Clive on the 21st June summoned a Council of War at which all the officers—twenty in number—above the rank of Subaltern were present. The following question was laid before them. “ Whether under existing circumstances, and without other assistance, it would be prudent to cross the river and come to action at “ once with the Nawab, or whether they should fortify themselves at “ Cutwah, and wait until the monsoon was over, when the Mahrattas “ or some other country power might be induced to join them.”

Contrary to the usual custom, Clive gave his own opinion first, which was to remain at Cutwah ; twelve other officers voted with him : Major Eyre Coote, and the remaining six voting for an immediate

advance. Coote amongst other reasons urging that delay would enable M. Law and his party to arrive, which would not only strengthen the enemy, and give vigour to their Councils, but would serve to weaken the English, owing to the number of Frenchmen who had entered their service after the capture of Chandernagore, and who would undoubtedly desert to their countrymen on the first opportunity.

After the Council broke up, Clive spent nearly an hour in deep meditation, and at last, notwithstanding the adverse decision of the Council of War determined to adopt the bolder course, and gave orders that the army should cross the river the next day. Leaving the sick with a small guard of Europeans and sepoys in the Fort of Cutwah, the troops began the passage at sun rise and by 4 p. m. all were landed on the opposite bank. No sooner had Clive reached the further bank, than he received a letter from Meer Jaffier, stating that the Nawab had halted at Munkarrah a village six miles to the south of Cossimbazar where he intended to intrench himself and await the attack of the English, and proposing that Clive should attack him by surprise, marching round the inland portion of the island. Clive at once sent back the messenger with the following answer, " That he should march to Plassey " without delay, and would advance the next morning six miles further " to Daadpore ; but if Meer Jaffier did not join him there, he would " make peace with the Nawab." *

Before sunset the Army commenced its march, following the course of the river, and conforming its progress with that of the boats, which as before, were towed against the stream. Owing to the recent heavy rain the country was inundated, and the troops had constantly to march through water up to their waists ; they reached Plassey distant about fifteen miles at one o'clock in the morning of the 23rd June. Here they took up their position in a grove of mangoe trees, and to their great surprise, heard the sound of drums and other music which convinced them that they were within a mile of the Nawab's army. His intention to remain at Munkarrah, had been formed upon the supposition that the English would have advanced immediately after they had taken Cutwah, in which case they would have reached Plassey before his army could have arrived there, but when he found that they were inactive, he continued his march and reached Roy Doolub's old intrenched camp twelve hours before the English arrived at the grove. Clive having examined his position and posted sentries permitted the rest of his troops to take rest. After their fatiguing march the men slept soundly, but few however of the officers and certainly not their commander sought sleep on that eventful morning.†

" The grove of Plassey extended north and south about 800 yards " in length, and 300 in breadth, and was planted with mangoe trees

* Orme Vol. 2 p. 171.

† Broome p. 141.

" in regular rows. It was enclosed by a slight bank and ditch, but the " ditch was choked with coarse weeds and brambles. The angle to the " south-west was 200 yards from the river, but that to the north-west " was not more than 50. A little to the north of the grove, and on the " bank of the river, stood a hunting house of the Nawab's encompassed " by a garden wall. The river, a mile before it reaches this house, " curves to the south-west, nearly in the shape of a horse shoe, includ- " ing a peninsula about three miles in circumference, of which the neck, " from the stream to the stream again, was not more than a quarter of " a mile across. About 300 yards to the south of the peninsula, began " an intrenchment which Roy Doolub had thrown up to secure his camp ; " the southern face, fronting the grove of Plassey, extended nearly in a " straight line, about 200 yards inland from the bank of the river, and " then turning to the north-east by an obtuse angle, continued nearly " in this direction about three miles. Within this intrenchment en- " camped the whole army, of which a part likewise occupied the " peninsula. In the angle was raised a redoubt, on which cannon were " mounted. About 300 yards to the east of this redoubt, but without " the camp, was a hillock covered with trees, and 800 yards to the south " of this hillock and the redoubt, was a small tank or pond ; and 100 " yards further to the south was another, but larger tank ; both, as are " all such public reservoirs of water in Bengal, were surrounded by a " large mound of earth at the distance of some yards from the margin " of the water."*

The English force actually in the field amounted to 950 European Infantry including 100 Bengal and Madras, and 100 Bombay Topasses. There were 100 Artillery men, also 50 sailors and seven midshipmen under the command of Lieutenant Hayter who acted as artillery men ; a detail of lascars was also attached to the Artillery. The Native Infantry numbered 2100 partly Madras sepoys, and partly the newly raised Bengal Battalion. The artillery train was composed of 8 six pounders and 2 small howitzers.†

The Nawab's army was computed at 50,000 foot, 18,000 horse and 53 pieces of artillery. The greater part of the Foot were armed with matchlocks, the remainder with pikes, swords, bows and arrows, and rockets. The cavalry were of a superior description, both men and horses being drawn from the northern parts of India. The guns were mostly of heavy calibre being 18, 24 and 32 pounders, they were mounted on large platforms furnished with wheels, on these platforms in addition to the gun, the gunners to work it and all its ammunition were conveyed. Each platform was drawn by 40 or 50 yoke of oxen of the largest size, and an elephant walked behind trained to assist by pushing it forward with his head whenever it came to a difficult place. A body of between 40 and 50 Frenchmen, chiefly deserters, under M. de Sinfray formerly

* Orme Vol. 2 p. p. 172-173. .

† Broome p. 142, Malcolm's Life of Lord Clive Vol. 2 p. 256.

one of the Council at Chandernagore was by far the most efficient portion of the whole force ; they acted as artillery men and had four light field-pieces attached.

At day-break, the Nawab's army was perceived marching out of its camp towards the grove. The Infantry and Cavalry marched in many separate and compact bodies with the intention as it appeared of surrounding the English. The artillery, contrary to their custom, was dispersed about between the different bodies of troops. Clive from the top of the hunting house watched the enemy's dispositions, and was surprized at their numbers and apparent confidence. Judging that if his own troops remained in their sheltered position in the grove, the enemy would impute the cause to fear, and grow bolder, he formed up his troops in line in front of the grove, facing the nearest tank and with their left resting on the hunting house. The Europeans were told off into four divisions :—the 1st commanded by Major Kilpatrick ; the 2nd by Major Archibald Grant ; the 3rd by Major Eyre Coote, and the 4th by Captain George Frederick Gaupp ; * on either flank of the Europeans were posted 3 six pounders. The Sepoys were drawn up in equal numbers to the right and left of the guns. The two remaining guns and the howitzers, with a small detachment of Infantry, were posted behind two brick kilns which were 200 yards in front of the hunting house and of the left division of sepoys. The line extended 600 yards beyond the grove, but the enemy in this direction were at such a distance as to preclude any danger of their falling upon this flank before a portion of the line could have been thrown back and formed in front of, and parallel to the east side of the grove, should such a movement have been considered necessary.

The French under de Sinfray took post with their field pieces, at the larger tank—the one nearest the grove—while two larger guns were advanced and halted on a line with this tank and close to the bank of the river; behind these two Batteries were stationed 5000 horse and 7000 foot under the command of Meer Moodeen the Nawab's best and most trusted general, and of a son of the favourite Mohun Lall. The remainder of the army extended in a curve, their right resting on the hillock near the camp, and sweeping round to about 800 yards to the eastward of the south-east angle of the grove, and in this part were the troops of Meer Jaffier, Roy Doolub and Yar Lootf Khan. †

At about 7 a. m. the action commenced by the discharge of one of de Sinfray's guns which killed one and wounded another of the Grenadier company which was posted on the right of the line of Europeans.

* This officer had come to India in command of a company of Swiss who had been subsequently incorporated with the Madras European Battalion, and was at this time serving in Bengal.

† "This chief, a Pathan by birth commanded 2000 horse in the Nawab's service, "but being a man of approved courage, and, after a fashion, of fidelity, he was "entertained by the Juggut Seths, for their protection in the event of any danger "threatening them." Broome p. 122.

This was the signal for the whole of the Nawab's artillery to open fire ; fortunately most of their shot flew high and did but little harm. The English pieces in advance at the brick kilns replied promptly and effectively to the fire of de Sinfrey's guns and the other guns of the enemy were answered by the six pounders on either flank of the Europeans ; they were however of too light a calibre to make any impression upon the heavy guns of the enemy ; but every shot told well in one or other of the dense bodies of their Cavalry or Infantry. Still—though many of the enemy were slain—the disparity of numbers between the contending forces was too great to render this of any advantage, and in half an hour, the English having lost 10 Europeans and 20 sepoys, killed and wounded, Clive ordered the whole army to retire into the grove.

The enemy were greatly elated by this movement of the English, and at once advanced their guns nearer, and fired with greater vivacity than before ; but their shot only hit the trees, for the men had been ordered to sit down and were well protected by the bank ; openings in which were made to serve as embrasures for the field-pieces from which an effective fire was kept up killing and wounding a number of the enemy's gunners and causing several explosions of their ammunition.

At eleven o'clock Clive consulted his officers at the drum head, and it was determined to maintain the cannonade during the day, and at midnight to make an attack upon the Nawab's camp. About noon a heavy shower of rain falling, the enemy's powder got much damaged and their fire slackened considerably. Anticipating that the English had suffered in like manner a party of their horse advanced boldly towards the grove. The English ammunition however had been protected from the rain and the Cavalry were received with so warm a fire, that they retreated with great precipitation.

In this affair Meer Moodeen was mortally wounded by a shot from one of the six pounders. When the Nawab received intelligence of this misfortune he was greatly disheartened and immediately sent for Meer Jaffier, and as soon as he entered the tent flung his turban on the ground saying " Jaffier ; that turban you must defend" Meer Jaffier bowed, and with his hands in his breast, promised his utmost services ; and then returning to his troops and associates, at once dispatched a letter to Clive informing him of what had passed, and advising him to push forward immediately or at all events to attack the Nawab's camp at three o'clock the next morning. The messenger however was afraid to proceed while the firing continued, and it was not till late in the evening that Clive received the letter. In the meantime the terror of the Nawab increased, and Roy Doollub taking advantage of it, counselled him to return to his Capital ; his advice was listened to, and the Army was ordered to return to the intrenchment, whilst the Nawab accompanied by 2000 Horsemen fled on a fleet camel to Moorshedabad.

At about two o'clock the fire of the enemy's Artillery completely ceased and the greater portion of their Army retired to the intrenched camp. The French under De Sinfray still maintained their post at the tank, and as this was an advantageous position from which to cannonade the enemy during their retreat and perceiving that the French party were nearly isolated, Major Kilpatrick impatient to seize the opportunity, advanced from the grove with two Companies of the Battalion and two field pieces, and pushed on towards the tank at a rapid pace ; at the same time sending information of his intention and the reason for it, to his Commander who happened at the time to be in the hunting house.

Clive had gone to the hunting house for the purpose of changing his clothes and obtaining some rest, but before doing so, had instructed Major Kilpatrick to send him notice should the enemy make any change in their dispositions, it was moreover understood that the decision to maintain the cannonade during the day and to attack the intrenched camp at night was to be adhered to. It has been said that when Major Kilpatrick's message reached the hunting house, Clive was asleep, and attempts have been made to attach blame to him on this score. If the story be true—considering the amount of fatigue he had undergone—no imputation could justly be made either against his courage or conduct, on the contrary—as it has justly been observed—it would only serve to prove the nerve and coolness of the man who could snatch a few moments repose at such a moment and under such circumstances.*

On receiving the message Clive expressed his astonishment that such a step should have been taken without his orders, and immediately hastened after the Detachment which he reached, just before it arrived at the tank. He at once ordered Major Kilpatrick under arrest but was soon pacified, and directed him to go back to the grove and bring up reinforcements considering that it would be better to bring on a second action and make it decisive, than to retreat ; De Sinfray seeing his party left without support abandoned the tank and retreated to the redoubt in the angle of the intrenchment where he planted his field pieces ready to act again. Clive then sent the Grenadier company of the 39th Regiment, and a Grenadier company of Sepoys, to lodge themselves behind a bank that was close to the enemy's lines, from whence they kept up a continual fire with their small Arms, as did the Detachment at the tank from its field-pieces.

As the main body of the English were advancing to the tank, that part of the Nawab's Army, which, in the beginning of the action had been stationed on the left flank opposite to the south-east angle of the grove, lingered in the retreat behind the rest, and when they had come almost abreast of its northern side, halted, faced, and advanced towards

* Broome p. 147.

the north-east angle. These were the troops of Meer Jaffier ; but their signals not being understood, it was supposed that they intended to fall upon the baggage and boats, whilst the English Army was engaged at the tank. Three platoons and a field-piece under Captain Grant and Lieutenant Rumbold were accordingly detached to oppose them, and the fire of the field piece which was worked by Mr. John Johnstone,—a volunteer—soon stopped the advance of the supposed enemy.

In the meantime the enemy pushed out several small bodies of troops and some of their Artillery from the intrenchment. Upon this Clive advanced nearer and posted half his troops and Artillery at the lesser tank, and the remainder on some rising ground about 200 yards to its left. From these stations a heavy fire was opened upon the enemy's guns killing many of the draught oxen, and the elephants becoming unruly the whole of their Artillery was thrown into confusion. The party of French under De Sinfray, however, continued to ply their guns with vigour from the redoubt ; and the enemy's matchlock men from the intrenchments and from the hillock to the east of the redoubt maintained a constant but irregular fire. Their Cavalry also advanced several times threatening to charge, but were always repulsed by the fire of the English guns. It was here that the contest was most obstinate and the English sustained their heaviest loss.

At last, a body of troops was seen moving away from the field of battle without joining the rest of the Nawab's army. This convinced Clive that they were those under Meer Jaffier's command, and having now no danger to apprehend on his flank or rear, he determined to make one vigorous effort for victory by attacking simultaneously the redoubt in which De Sinfray was posted, and the hillock to the east of it, behind which it was suspected there was an ambuscade. Two detachments were appointed for this purpose, whilst the main body was to advance in the centre, ready to support both and to act as occasion should demand. The Detachment on the right gained the hillock without firing or receiving a shot ; at the same time the Detachment on the left marched up to the redoubt, which De Sinfray—finding himself again deserted by the Nawab's troops—abandoned without resistance, and without carrying off his field-pieces. This position having been carried, no further opposition was attempted, and by 5 o'clock the English were in possession of the whole intrenchment with no other obstacle to their advance than what they met from the enormous quantity of tents, baggage and stores dispersed around them.

The success was rendered more complete by the arrival of the messenger with the letter Meer Jaffier had sent at noon ; shortly after another messenger arrived by whom Clive sent a note requesting Meer Jaffier to meet him the next morning at Daoopore, a place about six miles from the field of battle.

The troops having been informed that they should obtain a donation in money, received the orders to push on to Daoopore with cheers

notwithstanding the fatigue they had undergone during the last two days, and the temptation to plunder the property spread on the field. A Detachment having been sent forward under Major Coote to observe if the enemy were making any attempt to rally, the main body made a short halt to enable the Commissaries to take possession of as many of the Nawab's splendid bullocks as sufficed to replace the inferior cattle with which the English Artillery and store carriages were equipped, and by 8 o'clock the whole army had reached Daoodpore.

This important victory was gained with but little loss, the casualties amounting only to 7 Europeans and 16 sepoy killed, and 13 Europeans and 36 sepoy wounded ; of the Europeans 6 of the killed and 10 of the wounded belonged to the artillery on whom the brunt of the action fell ; and two officers of this arm were wounded but their names are not recorded. These were the only casualties amongst the Military officers, but Mr. Shoreditch, a midshipman of the Kent, was wounded by a musket bullet which went through his right thigh, as he was eagerly advancing to shoot one of the French officers.

On the morning of the 24th Meer Jaffier accompanied by his son Meerun arrived at Daoodpore. On entering the English Camp as he alighted from his elephant, a guard—which had been drawn out to do him honour—presented arms, not knowing the nature of the compliment, he started back as if he anticipated treachery ; Clive advancing hastily, saluted him as Nawab of Bengal, Bahar, and Orissa, and removed his fears. After a conference of about an hour, he making apologies for his conduct while Clive, abstaining from reproach, advised him to proceed at once to Moorshedabad and not to suffer Sooruj-u-Dowlah to escape, nor his treasures to be plundered, Meer Jaffier returned to his troops and hastened to Moorshedabad where he arrived on the evening of the same day. In the afternoon the army marched to the village of Boptah, six miles from Daoodpore.

Sooruj-u-Dowlah reached Moorshedabad before midnight of the day of the battle. Early the following morning he sent away his women with 50 elephants laden with their necessaries, and the greater part of his own jewels, and some gold rupees. Having lost all confidence in the principal officers of his court, all of whose fortunes either he or his grandfather had made, he determined to quit Moorshedabad, and join M. Law and proceed with him to Patna, the Governor of which province was a faithful adherent to his family. The arrival of Meer Jaffier, although he attempted nothing, hastened his departure, and at ten o'clock at night, disguised in a mean dress, carrying with him a casket containing his most valuable jewels, and accompanied only by his favourite wife and the Eunuch who governed his seraglio, he embarked in a small boat and rowed away to the northward.

Soon after midnight Meer Jaffier was informed of his flight and at once sent several parties in pursuit. In the morning the city was in

great confusion, the Nawab had fled, but his successor had not been proclaimed, the English were advancing and few knew what to expect.

At noon on the 25th the English Army arrived and halted at Maudipore from whence Clive sent Messr. Watt, and Walsh, with an escort of 100 sepoys to wait upon Meer Jaffier. Their arrival convinced the inhabitants whom they were to look up to as their future ruler and their exhortations, combined with the vicinity of the British Army encouraged Meer Jaffier to proclaim himself Nawab. The next three days were spent in trying to arrange matters relative to the payment of the promised donations to the army, navy, and the members of the Select Committee, together with that to the company and the restitution to the inhabitants of Calcutta. These sums altogether amounted to 22,000,000 sicca rupees equal to £2,750,000 a sum which the whole of the Nawab's treasury, jewels and property, was not sufficient to meet.

Clive had intended to enter the city on the 27th but having received information of a reported conspiracy to assassinate him, in which Meerun the son of Meer Jaffier, Roy Doolub and, Kuddum Hoossain Khan, an officer of distinction, were engaged, he waited the next day at Cossimbazar for further information concerning the plot. The report appears to have been unfounded as Clive's apprehensions were speedily removed.

On the 29th escorted by 200 Europeans and 300 Sepoys Clive entered the city and proceeding to the palace where all the chief officers were assembled he conducted Meer Jaffier to the throne, and saluted him as Nawab with all the usual forms, and the next day it was arranged that one half of the money should be paid immediately, two thirds in coin, the rest in jewels plate and effects which were to be taken at a valuation. The remaining half to be discharged in three years in three equal payments.

On the 26th June, the women and 50 elephants which Sooruj-u-Dowlah had sent away previous to his flight were stopped by a party of Meer Jaffier's troops at Bogwangolah, a town on the Ganges fifteen miles north-east of Moorshedabad. On the 2nd July news was received that Sooruj-u-Dowlah had been taken. The rowers of his boat fatigued with their toil stopped in the night to rest at Raj Mahal, and the Nawab and his wife took shelter in a deserted garden, at day break he was discovered by a man whose ears he had caused to be cut off thirteen months before ; this man revealed him to the brother of Meer Jaffier who was living in the town, and he informed the soldiers who were in pursuit. They hurried him back to Moorshedabad and brought him about midnight before Meer Jaffier. It is said that at the sight of his former master Meer Jaffier was moved with compassion, but his son Meerun, a youth not seventeen, insisted on instant death, and seeing his father's unwillingness to pronounce the sentence, advised him to go to rest, saying he would take care of the prisoners ; Meer Jaffier pre-

tending to understand these words in their most merciful sense, retired to his apartments. In the meanwhile Sooruj-u-Dowlah had been removed to a distant chamber, one of the vilest of the palace ; no sooner had his father retired, than Meerun sent an order by one of his servants to the guard, for Sooruj-u-Dowlah's death. Their boisterous intrusion into the chamber convinced him of their purpose, and the instant terror of death threw him into an agony of lamentation ; recovering himself he asked leave to perform his ablutions and say his prayers. A pot of water happened to be near, which the executioners impatient to finish their work, threw over his head. The servant then struck him with a dagger, and the swords of the others completed the deed. The next day the mangled remains were carried through the city on an elephant and then taken to the tomb of Allaverdy Khan where they were buried. Thus perished Sooruj-u-Dowlah in the 20th year of his age, and the fifteenth month of his reign.

On the 6th July Rs. 7,271,666 in coined silver was received from Meer Jaffier. This treasure packed in 700 chests, and embarked on board 100 boats was guarded by soldiers as far as Nuddea, from thence all the boats of the fleet, and many others, with banners displayed and music sounding escorted it to Calcutta in a triumphal procession, to contrast with that in which the people living on the banks of the Ganges had seen Sooruj-u-Dowlah returning the year before from the capture of Calcutta.*

As soon as M. Law received Sooruj-u-Dowlah's summons he set out from Bhaugulpore, and had arrived within 20 miles of Rajmahal when he heard rumours of the battle of Plassey ; on this he halted waiting for more certain information, and two days after received intelligence that Sooruj-u-Dowlah was a prisoner. He at once determined to retreat to Patna with the intention of offering his services to Ram Narain the Governor of Behar, who foreseeing that in the event of renewal of hostilities with the English, M. Law's party would be an important resource to Sooruj-u-Dowlah, had supplied them with the means of subsistence from the time they had entered his province. It was moreover known that Ram Narain had a great personal enmity to Meer Jaffier. Under these circumstances Clive urged Meer Jaffier to send either a lightly equipped force strong enough to destroy the French party before they could reach Patna, or one of sufficient strength to overawe Ram Narain and prevent him taking the party into his pay when they should arrive there. Meer Jaffier however did not feel so confident in the fidelity of his troops as to trust any considerable body of them at a distance, but was ashamed to acknowledge his mistrust ; Clive perceiving how matters stood, determined to undertake the pursuit of M. Law with British troops alone.

* By the fifth article of the treaty concluded with Sooruj-u-Dowlah on the 9th February 1757, the English obtained permission to coin Sicca rupees, both of gold and silver, of equal weight and fineness to those coined at Moorshedabad. A mint was now established at Calcutta and the first rupees were coined there in August 1757.

THE BRITISH THE Nawab had fled but his successor had not been named the English were advancing and few knew what to expect.

A week in the after the English Army arrived and halted at Lakhnauti. The members of the Senate Nawab, West and Walsh, with a party of 1000 men from Meer Jaffier. Their arrival confirmed the English and those who were anxious to as their future to a man that they had no time to waste with the safety of the British Army advancing. A demand was made on the Nawab. The next day he sent a deputation consisting of 100 men relative to the payment of the demands which he had easily, and the members of the Senate came in and say the whole sum to the company and the Nawab would be remunerated of £100000. These sums allegedly amounted to £200000. Some reports say £270000 a sum which was paid in the Nawab's treasury jewels and property, was demanded by them.

Clive had intended to enter the city on the 27th but having received information of it as a secret conspiracy to assassinate him, in which Dost Ali and son of Meer Jaffier, Day Doolub and, Kuldum Dost Ali, the officer of Dost Ali were engaged, he waited till the 29th and then received the formal information concerning the plot. The court members who have been compensated as Clive's apprehension were freed of them.

On the 29th assisted by 200 Europeans and 300 Sepoys Clive entered the city and directed his men to see where all the chief officers were assembled to proclaim Meer Jaffier to the throne, and saluted him as Nawab. On the same night and the next day it was arranged that the last of the money should be paid immediately two thirds of which the Nawab agreed to pay in arrears which were to be taken at a subsequent date. The remaining half to be discharged in three years in three annual payments.

On the 2nd June the women and 30 elephants which Sooruj-ud-Daulah had sent previous to his flight were stopped by a party of English soldiers near Rangoonpore a town on the Ganges which is now known as Barrackpore. On the 2d July news was received to the effect that Sooruj-ud-Daulah had been taken. The rowers of his boat fainted and so he was compelled to rest at Raj Mahal, and the women who had come with him to rest at a deserted garden, at day break he was seen to be dead & his ears he had caused to be cut off thirteen days before he was taken. He was delivered to the brother of Meer Jaffier who was the son of the Nawab and he returned the soldiers who were in his service. They forced him back to Mooshedabad and brought him before the Nawab Meer Jaffier. It is said that at the same instant that the Nawab Meer Jaffier was moved with compassion to see women had been executed on instant death. A woman a widow and seven year old insisted on instant death. A woman a widow refused to persevere the sentence, advised her to be allowed to make take care of the prisoners; Me

tending to understand these words in their most merciful sense, retired to his apartments. In the meanwhile Sooruj-u-Dowlah had been removed to a distant chamber, one of the vilest of the palace ; no sooner had his father retired, than Meerun sent an order by one of his servants to the guard, for Sooruj-u-Dowlah's death. Their boisterous intrusion into the chamber convinced him of their purpose, and the instant terror of death threw him into an agony of lamentation ; recovering himself he asked leave to perform his ablutions and say his prayers. A pot of water happened to be near, which the executioners impatient to finish their work, threw over his head. The servant then struck him with a dagger, and the swords of the others completed the deed. The next day the mangled remains were carried through the city on an elephant and then taken to the tomb of Allaverdy Khan where they were buried. Thus perished Sooruj-u-Dowlah in the 20th year of his age, and the fifteenth month of his reign.

On the 6th July Rs. 7,271,666 in coined silver was received from Meer Jaffier. This treasure packed in 700 chests, and embarked on board 100 boats was guarded by soldiers as far as Nuddea, from thence all the boats of the fleet, and many others, with banners displayed and music sounding escorted it to Calcutta in a triumphal procession, to contrast with that in which the people living on the banks of the Ganges had seen Sooruj-u-Dowlah returning the year before from the capture of Calcutta.*

As soon as M. Law received Sooruj-u-Dowlah's summons he set out from Bhaugulpore, and had arrived within 20 miles of Rajmahal when he heard rumours of the battle of Plassey ; on this he halted waiting for more certain information, and two days after received intelligence that Sooruj-u-Dowlah was a prisoner. He at once determined to retreat to Patna with the intention of offering his services to Ram Narain the Governor of Behar, who foreseeing that in the event of renewal of hostilities with the English, M. Law's party would be an important resource to Sooruj-u-Dowlah, had supplied them with the means of subsistence from the time they had entered his province. It was moreover known that Ram Narain had a great personal enmity to Meer Jaffier. Under these circumstances Clive urged Meer Jaffier to send either a lightly equipped force strong enough to destroy the French party before they could reach Patna, or one of sufficient strength to overawe Ram Narain and prevent him taking the party into his pay when they should arrive there. Meer Jaffier however did not feel so confident of the fidelity of his troops as to trust any considerable party to a distance, but was ashamed to acknowledge his distrust, and on receiving how matters stood, determined to undertake the defence of Patna with British troops alone.

* Treaty concluded with Sooruj-u-Dowlah on the 9th Feb. 1757, by which he agreed to permit the mint to coin Sicca rupees, both of gold and silver, and to the value of Rs. 1,000,000, at Moorschedabad. A mint was established there in 1758, and coins were coined there in August 1757.

Clive came to this decision on the 4th July, and at once sent forward two companies of Sepoys under a Native Officer named Mooten Beg, and on the 6th Major Coote with 2 companies of European Infantry under Captain Alexander Grant of the Bengal service, a detail of Artillery with 2 six pounder field-pieces commanded by Lieutenant Kinch, 50 Lascars, and three companies of Madras Sepoys and 10 Bildars, commenced his march from Moorshedabad. The total strength of the detachment was 223 Europeans, Officers, and Artillery included, and 500 Sepoys including the advanced guard. The baggage stores ammunition and provisions were laden upon 40 boats, all of which were ill equipped.

The next morning the Europeans were embarked on board the boats, the sepoys marching along the bank of the river, and the following day meeting the Royal fleet of boats from Dacca, Coote induced the officer in charge to give him three light boats and 87 boatmen. Leaving the European soldiers and boats to follow under Captain Alexander Grant, Coote accompanied by Mr. John Johnstone of the Civil Service—who now acted as his Secretary—pushed on by land to overtake the advanced party. On the evening of, the 9th he reached Dogatchee and had an interview with Meer Jaffier's brother, Daoood Khan, who commanded at Rajmahal, by whom he was informed that M. Law had left Terriahgully but a few days before. The next morning Coote pushed on to Rajmahal where he found Mooten Beg who had been joined by 120 horsemen under two of the Nawab's Jemadars.

The Europeans arrived late the following night having experienced great difficulty in making any progress owing to want of boatmen, and proper tackle for towing the boats.

Here Coote was shown by an official of the Nawab, a letter he had received from M. Law, dated the 6th, from Bhagulpore. In it, M. Law stated that he intended to proceed by slow marches to Patna where he hoped to receive orders from Meer Jaffier, and enclosed a petition which he requested might be sent on to the Nawab. Major Coote took possession of the letter which he enclosed in one he wrote the same night to Colonel Clive, reporting the difficulties he had encountered that the two Jemadars had not received orders to accompany him further, and that they positively refused to march without an advance of pay which he had not the means to furnish, also that Daoood Khan had neglected to strengthen the detachments at the passes of Terriahgully, and Sikreegully although he had promised to do so. In conclusion he requested instructions as to his further movements, also relative to the disposal of a Swiss, in the French service, named Alexander Saussure, who had been captured by the advanced party, disguised as a native. On the 13th, he received a letter from Clive written some days previously directing him to follow M. Law as far as Patna, if he did not come up with him before reaching that place.

On the same day a Sergeant, named Duvergne, reported that the prisoner Alexander Saussure, had been endeavouring to persuade him to desert, and to carry over with him as many men as he could to the French, that he had also disclosed to him a scheme which he had formed for his escape through the connivance of a sepoy who was on guard over him, and further, that he had communicated to him the contents of a letter which he had written to M. Law giving an account of the proceedings of the Detachment and its strength. The Major, on receiving this report, sent Lieutenant Flacton to search the prisoner, on whose person was found the letter to M. Law, and another of some importance.

From the letters and other evidence which was forthcoming, it appeared that Saussure had come to India in the Swiss Company raised by the English for service at Bombay. Deserting from the English, he entered the service of the Dutch in which he obtained a Commission, but having whilst stationed at Batavia killed one officer and wounded two others in duels, he was compelled to make his escape. He managed to reach Pondicherry where he soon engaged in another duel and was obliged to leave that place also, which he did in a Danish ship bound for Bengal, where he arrived a short time before the battle of Plassey and at once joined the small party under De Sinfray.

In his letter to M. Law he gave a full account of the battle of Plassey, and stated that had he been supported with 4,000 men as an advance guard, and which Sooruj-u-Dowlah had actually promised him, he would have prevented the English from taking possession of Plassey grove. To the nonperformance of this promise, and the want of support given to the party of French stationed at the tank, he attributed the loss of the action.

He went on to say, that he had proposed to De Sinfray to march up the country and endeavour to join M. Law, but that De Sinfray declared it was impracticable, and had desired his people to disperse, and take the best care they could of themselves. He added, that he had designedly secreted himself until Major Coote had commenced his march ; advised M. Law to get a pass-port from Meer Jaffier to secure him a safe and uninterrupted passage through his country, though he acknowledged, that the Nawab, influenced by Colonel Clive, had actually dispatched orders to the Governor of Patna to detain him and his party on their march. However, said he, "you, Sir, have it "in your power, with the troops under your command, to get the better "of the English detachment, which is now in pursuit of you. In the "twinkling of an eye, you may entirely change the face of affairs here. "Your name is in high repute among the *Moors*, and the military "reputation of M. Bussy, is so great and dreaded, that this party must "instantly fly at his very name." He then proceeded to advise M. Law, to make a sudden countermarch and attack the English detachment in the night, at a place which he particularly described ; assuring him, that by such a *coup* he might easily kill or make prisoners all the

officers, especially those of the Sepoys, who were he stated, "more addicted to drunkenness than the Europeans themselves." He concluded the letter with these words: "I wished to have delivered to you "in person this intelligence, but on the third day of my journey, I had "the misfortune to be arrested, disguised like a Moor : I shall do "everything in my power however to make my escape, for which "purpose I beg you to send with the bearer, a good *Alcara*, who "understands the Portuguese language.—The English arrived at "Rajmahal on the 11th instant."—*

The prisoner being brought before Major Coote, and the other officers, acknowledged that he had written the letter, and having nothing to plead in his defence, was sentenced to death, and the Major thinking it adviseable to carry the sentence into immediate execution he was accordingly hanged that evening in front of the Battalion. The sepoy whom he had seduced was tried the next day by a Court Martial composed of Subadars and Jemadars, who finding him guilty of consenting to connive at the escape of Alexander Saussure, sentenced him to receive 500 lashes with a rattan and to be turned out of the service.†

On the 15th Major Coote started from Rajmahal with his boats in almost as inefficient a state as when he had arrived, Daood Khan not having fulfilled any of his promises to get better boats or more boatmen. On the 18th he reached Bhaugulpore, where he received a letter from Mr. Peakes the Chief of the English factory at Patna, telling him that M. Law had passed that city and was marching on to the territories of Shoojah-u-Dowlah the Nawab of Oudh, and that his party consisted of about 100 Europeans, 125 Coast, and 40 Bengal sepoys with 8 field pieces. Pushing on, Coote, after overcoming many difficulties reached Patna on the 26th where he remained until the 31st when he marched by easy stages for Chuprah where he arrived on the 4th August ; here he received information that M. Law was at Benares, 140 miles distant under the protection of Raja Bulwunt Singh a feudatory of the Nawab of Oudh.

Coote remained at Chuprah till the 12th when he received orders to return to Patna. On the morning of the 13th the whole of the troops Europeans and Sepoys together with the guns and ammunition were embarked in boats and so rapid was the current, that the Detachment reached Patna, a distance of 44 miles, by noon of the same day. On the 1st September orders were received for the return of the Detach-

* Ives p. p. 158, 159.

† This is the first instance on record, in the Bengal Army, of the assembly of a Native Court Martial, see Broome p. 168. The position of Native Officers was not at this time clearly defined, subsequently Subadars and Jemadars were called Warrant, and Havildars and Naicks Non-Warrant Officers. In March 1786 it was directed that Subadars and Jemadars should be styled Commissioned, and Havildars and Naicks Non-Commissioned Officers. Commissions were accordingly issued to the former, under the signature of the Commander-in-Chief, in lieu of the Warrants which had previously been granted by the Colonels commanding brigades.

ment to Moorshedabad. The field pieces with the Lascars under an escort of a Jemadar and 19 Sepoys at once marched from Patna, and on the 7th the whole of the troops embarked in boats and arrived at Moorshedabad on the 13th where Coote received orders to go to Chandernagore taking with him the King's troops, a Company of Swiss and 200 Sepoys, but being unwell, he was obliged to remain at Cossimbazar for a few days and Captain Gaupp took down the Detachment.*

* Ives devotes a whole chapter to a narrative of Major Eyre Coote's expedition in pursuit of M. Law. On the 23rd of July the expedition reached Burreal, here, owing to the numerous accidents which had happened to the boats, Coote considered it necessary to disembark the whole of the troops, and marched that evening to Derriahpore a distance of six miles, the field pieces and ammunition being drawn and carried by the Troops. The next day he marched twenty miles to Perraruck; during this march, the European soldiers, expressed the greatest discontent, complaining of the fatigues they had undergone, and of the hardships they had suffered for want of shoes and arrack, and at last positively refused to go any further. Coote finding that the men were deaf to his orders, and at the same time perceiving that the wind was more favourable than it had been before, thought it advisable to re-embark the European troops, and putting himself at the head of the Sepoy's he marched with them to Bhar, which was six miles further.

"On the arrival of the European soldiers at Bhar, Coote sent some of the sergeants to them, with a message reminding them of the favours he had conferred, and how ready he had been to oblige them upon all occasions, and how sensible he was of their present bad behaviour; and concluded, with assuring them, that if they did not presently amend, he certainly would represent their conduct to Colonel Clive, and the rest of the army and leave them behind at Patna. They returned for answer, that they should look upon the latter part of the disgrace as the most desirable event that could happen to them, since they were persuaded, that their officers' intention was to kill them in order to put their prize money into their own pockets." The sergeants told the Major, that there was nothing new in their present behaviour, for that they had been grumbling during the whole expedition. The Major sorry to find that his remonstrances had no effect, wrote to Colonel Clive, informing him that if on his arrival at Patna, he should find M. Law was still within the bounds of the Nabob's country, he then proposed to go on in pursuit of them with the Sepoys only, leaving the Europeans (who in their present temper he thought could not be depended upon) to follow by easy marches under the command of Captain Alexander Grant; and requested his positive orders, whether if the Nabob's forces refused to accompany him, he should with the Sepoys only, pursue the French into the next province." On the 25th the Major reached Bykulpore, distant 10 Coss from Bhar and there received a letter from Ram Narain expressing his uneasiness at not having received more early advice of his arrival in the province, and stating that he had sent some of his principal officers to meet him and conduct him to Patna. Soon after this a relation of Ram Narain waited upon the Major, and assured him that the Rajah had sent 2000 men after the French, but that unluckily they had got out of his province. A second letter was shortly after received from Ram Narain in which he declared, that had he been advised in time he could easily have stopped the French, but as that was now impracticable, he would on the Major's arrival in the city, consult with him as to the future. Coote replied that he should be at Patna next day and would then wait upon him, and with his advice settle his plan of operations. The Chief of the Dutch factory sent his second in the state budgeorow to conduct the Major to Patna, and Mr. Peakes the Chief of the English factory also waited upon him. On the 26th having sent off the Sepoys and Artillery by land Coote put off with the fleet, and at ten o'clock at night reached the English factory, where he quartered all the Europeans and Sepoys. In passing the Dutch factory he was saluted with 21 guns and received a visit from its chief, Mr. Delatour, he also received a letter from Ram Narain asking him, as the hour was late to defer visiting him till the next morning. Coote finding that his remonstrances to the soldiers on the 24th had been attended with no good effect, ordered a Court martial to assemble on the 28th for the trial of the ring leaders, 30 of whom were sentenced to be flogged, and the punishment was immediately carried into effect in the presence of the whole detachment. By this timely severity a total stop was put

It was fortunate that De Sinfray did not listen to the advice of Saussure, as if he had M. Law's party would have been nearly as strong as that of his pursuer's with the advantage of acting in a friendly country. After Plassey, De Sinfray retreated into the Bheerbhoom district, where he was left unmolested by the Native authorities and was subsequently joined by many of his countrymen who had escaped either from the different French factories, or from their confinement at Calcutta.

Another party under M. Courtin late chief of the factory at Dacca, had, after the defeat of Sooruj-u-Doulah, established themselves in the Rungpore District, and intrenched themselves on the bank of the Teesta under the foot of the hills.

On the 17th September news reached Calcutta of the arrival off the Coast of Madras, of a powerful French squadron under M. Bouvet, further advices speedily followed urging the immediate return of the troops to Madras. These requisitions could not however be complied with, as by doing so, not only would the observance of the treaty made with Meer Jaffier have been endangered, but it was more than probable that a French force might be landed in Bengal which would have been

to any further disorders among the European troops. But, on the following day, when the Sepoys paraded for the purpose of continuing the pursuit of the French, they grounded their arms, and refused to go any further. They complained of the great fatigues they had undergone, the immense distance they were removed from their families, the promises that had been made them at Madras that they should go no farther than Calcutta, which was afterwards changed to Chandernagore, and then to Moorshedabad, and that now they saw no end to their marching ; they further complained that they had not received their just pay. Major Coote pointed out to them the ill consequences which would necessarily accrue from their conduct, that they were then surrounded by the Rajah's troops, whom they had no reason to consider as well affected towards them ; that by quitting their arms, they were rendered incapable of defending themselves ; and that if no greater misfortune happened to them, they might be sure that they would be plundered of what little they had, besides forfeiting all the prize money which was due to them ; but that if these representations had no weight with them, they were at liberty to go wherever they thought proper, as he had already provided men to take up the arms they had so shamefully abandoned. This remonstrance had the desired effect, the men resumed their arms, and with the Artillery, marched at once to Bankipore, the European Infantry proceeding thither by water. On the 31st the Detachment resumed its march reaching Chuprah on the 4th August, here having received information that M. Law's party was at Benares 140 miles from Chuprah, where they were living under the protection of Rajah Bulwunt Singh, a feudatory of the Nawab of Oude—Coote summoned a Council of War consisting of all the officers with the Detachment, and after placing before them all the information he possessed, requested them to state their opinions "whether, under existing circumstances it was advisable to continue the pursuit of M. Law and his party." They were unanimously of opinion that it was not, and recorded their reasons for coming to this decision. They were then asked "whether the Detachment had better remain at Chuprah or return to Patna." The Council, without one dissenting voice, agreed that it was most expedient and indeed absolutely necessary, to return to Patna, especially as the surgeon had represented that the men were rapidly falling sick, owing as he apprehended to the ground being strongly impregnated with saltpetre. The arrack moreover which had been brought for the soldiers had been expended, and no further supply could be obtained in their present situation. Notwithstanding the decision of the Council, Coote determined not to leave Chuprah until he had received further instructions from Clive. At last, on the 12th August, a letter arrived from Colonel Clive directing the return of the detachment to Patna, upon which arrangements were made for its immediate departure.

joined by the parties under Messieurs Law, De Sinfray and Courtin, and possibly by M. Bussy from Chicacole.

Under these circumstances the number of French prisoners at Calcutta and the small bodies of Frenchmen in the Bheerbhoom and Rungpore Districts became the cause of much solicitude. The prisoners amounted to 200, of whom 50 being men of respectability had not been confined, but as there was reason to believe that they were in communication with Messieurs Law and Bussy, it was now determined to send all the prisoners of the higher class to Pondicherry. Accordingly, in the beginning of October, thirty-four were embarked on board a ship called the Restitution. Relying upon their parole the ship was manned by Lascars, the Captain and two mates being the only Englishmen on board; no sooner were they at sea than the Frenchmen overpowered the crew and taking the ship into Masulipatam, declared themselves free and the ship a lawful prize.

In November the Raja of Bheerbhoom dreading the vengeance of the English for the protection he had afforded to De Sinfray and his party, sent out several bodies of his troops to surround and seize them, but the French received information of his intentions, and he only succeeded in capturing twenty-four, whom he sent to Calcutta.

The greater part of the English troops having taken the field, the small force left at Calcutta was insufficient to guard with proper vigilance, the prisoners in confinement at that place. The building in which they were lodged was not large enough to hold them all, and as it was surrounded with high mud walls they were permitted* at all times to remain in the enclosure. Taking advantage of this and of the slackness with which they were guarded, they dug a hole under the wall, and on the night of the 18th December, the whole of them succeeded in making their escape, and before morning most of them had crossed the river and as none were immediately captured it was suspected that they had taken refuge in the Dutch and Danish factories, but the agents would not permit a search. A month afterwards 15 were recaptured at Midnapore, and in March 30 more who were trying to make their way through Orissa to join M. Bussy at Chicacole.

In the following April, at the request of M. Courtin, an officer was sent from Cossimbazar to Rungpore and the whole of the French in that District surrendered to him; their numbers having been reduced from 30 to 11 Europeans and from 100 to 30 Sepoys.

Orders were received in June 1758, for the return to England of H. M's. 39th Regiment, liberty being given to enter the Company's service to such officers and men who might desire to do so. In consequence of this permission four officers* and nearly all the men of the detachment serving in Bengal joined the Bengal European Battalion.

* Viz, Lieutenants Carnac and Yorke as Captains, and Ensigns Donnellon and Broadbrook as Lieutenants. The first officer subsequently became a Brigadier General and Commander-in-Chief in Bengal, the second was appointed Town and Fort Major

Clive finding it impossible to send back to their Presidencies the men of the Madras and Bombay Battalions incorporated them in the Bengal Battalion, but having determined to have no Topasses in the Battalion, all men of this class were sent back by the first opportunity.

In the meanwhile news had been received that Lally had captured Fort St. David ; that he was besieging Tanjore, and no doubt remained but that he would soon lay siege to Madras. Clive, however, knew that Fort St. George was well supplied with provisions, and that reinforcements were daily expected from England and that until the monsoon drove the English fleet from off the coast nothing could be attempted against Madras.

As soon as Lally had determined to undertake the siege of Madras he desired Messieurs Bussy and Moracrin to join him from the northern Circars, leaving the Marquis de Couflans with a Brigade for the defence of these provinces. The French force was no sooner reduced, than Anundeeraj the ruler of Chicacole and Rajamundry revolted, and marching to Vizigapatam—which was at the time defenceless—seized and confined the French Agent. He then wrote to Madras begging for assistance, but that Presidency being in no condition to afford aid, he applied to Calcutta, and Clive seeing the opportunity thus afforded of creating a diversion in favour of Madras determined—not however without considerable opposition from the Committee at Calcutta—to send a body of troops to support the Rajah.

The force selected for the service was composed of 5 Companies of the European Battalion under Captain Adnet, the second Company of Bengal Artillery with 100 Lascars attached and 2000 Sepoys. The Artillery train consisted of 6 six-pounder brass guns, 6 twenty-four pounders, a howitzer, an 8 inch mortar, and 2 Royals or $5\frac{1}{2}$ mortars. Lieutenant Colonel Forde was appointed to Command. This officer on the death of Major Kilpatrick* in the preceding October, had been invited by Clive and the Council at Calcutta, to take Command of the Company's troops in Bengal, he had accordingly resigned his commission as Major in the 39th Regiment and had come round from the Coast in the month of April with the rank of Lieutenant Colonel.

of Fort William in 1760 (the first occupant of that situation on record) and resigned the service in the following year. The third returned to England as a Captain, and in 1781 was executed at Warwick for the supposed murder of his brother-in-law. Sir Theodosius Boughton by means of Laurel water, the evidence against him was solely circumstantial and not of the strongest nature, he died solemnly protesting his innocence.

* It will be remembered that on news of the surrender of the factory at Cossimbazar reaching Madras, a detachment of 230 men, mostly Europeans, was sent round to Bengal under command of Major Kilpatrick. It sailed from Madras on the 20th July 1756, and arrived at Fulta on the 2nd of August. Here it was considered necessary to dis-embark the detachment and encamp it near the town, where owing to the swampy nature of the ground sickness prevailed to such an extent that on the arrival of the Squadron under Admiral Watson on the 15th December one half of the detachment were dead and of the remainder only thirty were fit for duty. In the following October Major Kilpatrick died, and at the time of his death only five of the detachment were alive.

Owing to various delays, chiefly caused by the opposition of the Council, the troops did not embark until the 12th October, when they at once set sail for Vizigapatau, where they arrived on the 20th of the same month. Having landed the troops and stores and left a small garrison at Vizigapatau Colonel Forde marched with the rest of the troops to join the Raja which he effected the 3rd November, and it was determined at once to advance and attack De Conflans who was reported to be encamped near Rajamundry with the whole French force.

The combined force came within sight of the French Army on the 3rd December. It consisted of 500 Europeans with between 30 and 40 pieces of cannon besides several mortars, 500 Native Cavalry and 6000 Sepoys. The English after deducting the garrison left at Vizigapatam amounted to 470 Europeans including Artillerymen, and about 1900 Sepoys* with 6 field pieces. The Raja had 500 miserably equipped Cavalry, and about 5000 Foot, few of whom had fire arms, the rest being armed with bows and arrows, and pikes. He had in his service a body of 40 Europeans deserters and renegades under an adventurer named Bristol, this party had 4 field pieces attached to it, and was the only portion of the Raja's Army upon which any reliance could be placed.

On the 8th was fought the battle of Condore which resulted in the defeat of the French, who were totally routed and dispersed ; thirty two pieces of Artillery, including seven mortars of from 8 to 13 inches, 50 ammunition carriages, a large supply of shot and shell, 1000 draught bullocks and the whole of their camp equipage and stores were captured ; 6 French officers and 70 Europeans were either killed or mortally wounded, and about 50 more were slightly wounded ; the prisoners amounted to 6 officers and 50 rank and file, the loss of their Sepoys must also have been considerable. Of the English, Captain Adnet,† 15 Europeans, and 100 Sepoys were killed ; Mr. MacGuire the Pay Master, Mr. Johnstone the Commissary—who was serving with the Grenadiers—two other officers, 20 Europeans and over 100 Sepoys were wounded. The Marquis de Conflans had early in the action sent off to Rajamundry 4 of the lightest field pieces together with the military

* The Sepoys consisted of the 1st and 2nd Battalions of Bengal Sepoys and the Battalion of Madras Sepoys. The 1st Battalion of Bengal Sepoys was commanded by Captain Ransfur Lee Knox, an active and intelligent officer, who appears to have held the command of the Battalion since its formation. He subsequently much distinguished himself, and in 1863 was appointed Quarter-Master-General of the Army, being the first officer who ever held that appointment in Bengal. The 2nd Battalion was commanded by Captain-Lieutenant Lachlan MacLean, and the Madras Battalion was commanded by a Native Commandant.

† On the death of Captain Adnet, the Command of the European detachment devolved upon Captain Christian Fischer, a Danish Officer, who had entered the service of the East India Company on the 7th February 1757. In 1766 when a second Major was appointed to each Brigade, Captain Fischer was the senior Captain, but owing to his being a foreigner, was debarred by the Regulations in force at the time, from rising beyond that rank. He was however made a Brevet Major and the command of the troops at Moteejheel near Moorshedabad conferred upon him. He appears to have been brought on the list of substantive Majors in the following year.

chest, and as soon as he saw that the defeat was complete, he mounted a fresh horse and accompanied by the Commandant of Artillery galloped off to Rajamundry, 40 miles distant, and the following day hastened on to Masulipatam. As soon as the action commenced the Raja's troops, horse and foot, took shelter in a dry tank, and as long as the fight lasted nothing could induce them to quit the protection which it afforded.

Immediately after the action, the 1st Battalion of Bengal Sepoys under Command of Captain Knox was sent to follow up the enemy, and prevent their rallying in the neighbourhood. The Battalion started at 5 p. m. and marched towards Rajamundry. The next morning Colonel Forde hearing that the French had stopped at that town sent 1000 more sepoys under Captain MacLean, to reinforce Captain Knox.

The town of Rajamundry is situated on the eastern bank of the Godaverry at a distance of 40 miles from the sea. In the middle of the town, and close to the bank of the river, was a large mud Fort of no strength, in which the French had established a dépôt for stores. Report having magnified the pursuing party of Sepoys into the whole Army, the French determined to abandon the Fort and at midnight on the 9th began to cross the river, but at day break the English Sepoys arrived and succeeded in capturing 15 Europeans who had not yet embarked, together with 4 small field-pieces, a brass 13 inch mortar, and all the baggage stores and bullocks which had escaped from the field of battle. In the Fort itself was found a large quantity of ammunition and stores.

Colonel Forde with the remainder of the English troops reached Rajamundry on the 11th but the Raja, did not arrive until the 16th, having remained on the field of battle to perform the funeral ceremonies of the few of his people who had been killed by stray shots.

When the force left Calcutta it had only been supplied with 80,000 Rupees in silver and 4000 Gold Mohurs, as the Raja had agreed that he would furnish all supplies and pay the troops, and it had been subsequently arranged that the first payment was to be made when he should be put in possession of Rajamundry. On the faith of this promise Colonel Forde had advanced him 20,000 Rupees from the Military Chest, and this loan together with a supply to the factory at Vizigapatam had exhausted all the money that had been brought from Calcutta, and the Colonel had nothing but the Raja's promises to look to for the payment and maintenance of his troops. He was most anxious to reach Masulipatam before the French should have recovered from the effects of their defeat but without money he could not move. After great delay and many excuses, the Raja advanced 6000 Rupees in cash and gave bills at ten days sight for 60,000 more, but six weeks had been lost, half of which time, if properly employed, would have accomplished all the objects of the expedition.

At length, on the 28th January 1759, the united forces again took the field but to avoid fresh disputes, Colonel Forde was obliged to agree to permit the Raja to march as he pleased, stipulating however that he should rejoin him at Ellore ; at which place the English arrived on the 6th February.

Emboldened by the inactivity of the English after their arrival at Rajamundry M. de Conflans had organized a force of 200 Europeans, 2000 Sepoys and 4 field pieces, which he called his " Army of observation," and entrusted its Command to M. Du Rocher one of his best officers.

Whilst waiting for the Raja at Ellore, Colonel Forde dispatched Captain Knox with the 1st Battalion of Bengal Sepoys to reduce the French Factory at Narseepore, 20 miles N. E. of Ellore. The Zamindar of the place having been induced to join Captain Knox, the French who had relied upon his aid, abandoned the factory, and went off to join the Army of Observation. Leaving a few men with the Zamindar's officers at Narseepore, Captain Knox returned to Ellore, where, on the 18th the Raja joined the Camp, and the next day the Zamindars of Narseepore arrived with 1500 Foot, armed in the fashion of the country. The Raja not being prepared to march, more valuable time was lost, and it was not until the 1st March that the Army resumed its march to Masulipatam.

M. de Conflans after his defeat on the 8th December, had written to the Subah of the Deccau requesting aid to destroy the English and punish those Chiefs who had revolted to their common enemy. Salabut Jung responded to the appeal, and set out with his army from Hydrabad and at the same time his brother Bissalet Jung marched with his troops from Adoni, and joined the Subah near the Kistna. Their united forces amounted to 15,000 Horse, and 20,000 Foot. The knowledge of the march of these troops however, in no way altered Colonel Forde's determination to proceed against Masulipatam.

On the 3rd March the English force with its allies encamped near a Fort called Kankale, in which the French had left a garrison of 13 Europeans and 2 Companies of Sepoys, Captain MacLean with 6 Companies of the 2nd Battalion of Bengal Sepoys was sent to capture the Fort. The garrison having been promised assistance by M. Du Rocher made a determined resistance, and Captain MacLean having failed in two desperate efforts to break in the gate with Crowbars, sent to the Camp for a couple of guns. They arrived in the evening under charge of an Artillery officer who at once, in spite of a heavy fire of small-arms took them up to the gate, and blew it open. The English Sepoys rushed into the Fort, and exasperated at the resistance they had met with, at the first onset killed all they met, but the Europeans remained concealed until the firing was over, when they surrendered themselves prisoners.

A few Europeans and Sepoys having been left to secure Kankale against surprise, the remainder of the force resumed its march and

arrived at Masulipatam on the 6th March. Here they found the Hardwicke, Indiaman, and two Pilot sloops at anchor in the roads ; and the same day received the cheering intelligence, that Lally had been compelled to raise the siege of Madras.

The Fort of Masulipatam is thus described by Broome :—“The Fort of Masulipatam was situated in N. Lat $16^{\circ}10'$ and E. Long $81^{\circ}14'$; it stood nearly a mile and a half from the sea shore, on the edge of a sound or inlet of the sea, surrounded on the other three sides by a morass, or swamp of considerable extent, formed partly by this inlet and partly by a branch of the Kistnah, which disengaged to the westward of the Fort ; this swamp varied in depth in different parts, and at different seasons from 3 to 18 feet, with a muddy bottom, and the inlet to the south of the Fort was upwards of 500 yards in breadth.”

“ The shape of the Fort might be considered an irregular parallel-ogram, with an average length of about 800 yards, and a breadth of from 500 to 600 ; the eastern side receding in an obtuse re-entering angle, and the western side projecting to nearly a corresponding extent ; the outline of the works consisted of eleven bastions of various sizes and shapes, connected by long curtains ; round the whole was a palisadoed berme, and a wet ditch, but no glacis, the ramparts were of earth, faced with masonry, as also was the counterscarp. The French who had taken possession of this place in 1751, had greatly improved and modernized its defences, and rendered it a very formidable fortification. The southern side, which rested on the sound or inlet of the sea, and was not easily assailable, had no defences except the bastions at either extremity. A range of sand hills extended on either side of the Fort to about half a mile inland, where they bordered the morass ; on the eastern side, these approached to within 800 yards of the Fort, which was the nearest available point from which the place could be assailed, and a nullah or creek formed the boundary between these sand hills and the morass. The town, or pettah of Masulipatam, was situated about a mile and a half to the north-west of the Fort, on a spot of rising ground, and was also surrounded by the morass, the communication between the Fort and pettah was by means of a narrow raised causeway, about 2000 yards in length, which led to the north-west bastion of the Fort, in which was the only gateway : about 120 yards of this causeway, nearest to the Fort, was formed into a long caponniere, which terminated in a ravelin or flèche, the faces and short flanks of which, as well as the sides of the caponniere, were further strengthened by a ditch all round.” *

There being no water in the Fort, except what was preserved in cisterns, the Marquis de Conflans, leaving a few guards in the Fort, had encamped with the remainder of his troops in the pettah. But no

* See Broome p. p. 226-227.

sooner did the English Army appear in sight—although his own force was superior in numbers, consisting of 500 Europeans, and 2000 Sepoys, independent of the Army of Observation—than he retreated into the Fort without making an effort to oppose them. The troops of Anundearaj and the Zamindar of Nursepore then occupied the pettah, whilst the English encamped on the sand hills to the north-east of the Fort.

With the means at his disposal it was quite impossible for Colonel Forde to make regular approaches, and as from the nature of the ground there was little to be apprehended from sallies from the garrison, he determined to erect detached Batteries on the sand hills to the east of the Fort, at the nearest approachable points. This position moreover had the advantage of being the nearest to the Hardwicke and two Pilot sloops from which the stores and heavy Artillery had to be disembarked. Three Batteries were accordingly constructed. One was situated close to a fishing village, near the inward point of the sand to the south-west of the Fort, bordered on the south by the inlet and on the west or front by the nullah, and was armed with two 24, two 18 pounders, and three mortars of 13, 10 and 8 inches each. Four hundred yards to the north of this Battery, and nearer to the edge of the nullah, was another Battery in which two 24 and two 18 pounders were placed. The third Battery was between the two, but retired about 100 yards, in it were mounted two 12 pounders which had been captured from the enemy.

" The front of the Fort thus attacked, consisted of four Bastions " with the connecting curtains. Of these one in the south-east angle, " resting on the sound, was called the *Francois*, mounting 10 guns ; " from hence the line of works receded, owing to the nature of the soil, " and formed a reentering angle, as already noticed, in which was situated a Bastion without flanks, the faces affording sufficient defence to " the curtains on either side, this was called the *Dutch* Bastion ; further on was the *St. John* Bastion, mounting 8 guns, and to the north-east angle of the Fort was another Bastion, called the *Camelion*, mounting 10 guns. The southern English Battery played upon the *Francois* and *Dutch* Bastions, the centre Battery on the *St. John*, " and the northern on the *Camelion*."*

As soon as the English Batteries were commenced, the besieged constructed a powerful Battery upon the other side of the inlet, the fire from which took all three of the attacking Batteries in flank ; but as this work was separated from the Fort by the whole width of the inlet, and was liable to a night attack by the boats of the ships, the garrison were compelled to keep a strong guard of Europeans and Sepoys in it. They also increased the strength of the guard stationed in the Ravelin at the end of the Caponniere on the other side of the Fort. Besides the superiority of Artillery mounted on their works,

* Broome, p. p. 227-228, see also Orme, Vol. 3 p. p. 479-480.

the besieged had a large supply of guns in store, ready to replace any that might become unserviceable, whereas the English could only replace theirs by 9 pounders borrowed from the Hardwicke or the useless guns belonging to the Raja.

No sooner had Colonel Forde reached Masulipatam, than M. Du Rocher marched to Rajamundry where the sick of the English Army, amounting to 25 Europeans and 40 Sepoys, had been left under Mr. Bristol, who had moreover just received a large sum in gold and silver which had been sent from Bengal for the use of the force. On hearing of the approach of M. Du Rocher, Mr. Bristol sent away the treasure to the Dutch factory at Coconada, and directed such of his men as were capable of doing so to make the best of their way to Vizigapatam. M. Du Rocher after taking possession of Rajamundry advanced two marches towards Vizianagram the capital of Anundeeraj, giving out that he intended to attack that place and the English factory at Vizigapatam ; his real object was to extort money from the neighbouring chiefs, but finding he could not collect enough to pay the expenses of his troops, he retraced his steps and marched to join the Army of Salabut Jung.

Alarmed by the movements of M. Du Rocher, no persuasions could induce the Raja to advance his credit or money for the wants of the English troops, which were now most urgent. No money remained in the chest, and Colonel Forde had borrowed all the money that the officers of the force possessed, and had even used the prize money of the men, whose pay moreover was several months in arrears. Under these circumstances, and perceiving the obstacles which must be surmounted before they could take the Fort, the troops became dispirited. At last their distress became so great, that the European Battalion broke into open mutiny, and on the 19th March turned out with their arms, and threatened to march away. Colonel Forde with much difficulty, prevailed upon them to return to their tents, and to select deputies to explain their complaints. The deputies declared that they were all determined not to serve any longer, unless they were paid their arrears, as also the prize money due to them and were assured of receiving the whole of the booty in case Masulipatam should be taken. Colonel Forde promised to pay them their arrears of pay as well as their prize money out of the first supply of money he should receive but explained that as according to the regulations authorized by the Crown, half only of the prize money taken in any Fort was to be given to the Captors, the remaining half belonging to the Company, he was unable to break through the regulation but promised that in consideration of their services and the hardships they had undergone, he would solicit the Company to give up their share of what might be found in Masulipatam, and that he would retain the amount until their decision was known.* These promises appeased the

* By letters patent from the Crown, dated the 14th January 1758, the East India Company were entitled to all booty and plunder taken solely by their forces or ships When the land or sea forces of the Crown might be engaged conjointly with those of

men who returned to their duty with their usual ardour. Such however was the want of means at the disposal of Colonel Forde that the Batteries were not completed until the 25th of the month, eighteen days after the arrival of the Army.

Salabut Jung as he approached, sent letters forward desiring Anundeeraj and the Zamindar of Nurseepore to leave the English and repair to his camp. On the 27th information was received that he had reached Beywarra about 40 miles from Masulipatam. Anundeeraj now got so alarmed that he marched off the following morning intending to return to his own territory on the other side of the Godavery. Colonel Forde sent messengers after him representing the folly of his conduct in thinking to escape the Cavalry of Salabut Jung on the one hand, and M. Du Rocher's force on the other, whereas by remaining with the English if Masulipatam was taken, all would be well, and if compelled to retreat he would have their support and assistance. The truth of these representations could not be gainsayed, and he returned to his position in the pettah. Colonel Forde unwilling to lose any chance of delaying the arrival of Salabut Jung, now asked permission to send a deputy to his Camp to represent the objects of the English, and Salabut Jung consenting, Mr. Johnstone was sent to his Camp on the 1st April.

The British Batteries opened fire on the 25th March and made several breaches in the enemy's works, these however were as quickly repaired during the night. On the 5th of April a severe storm of rain brought in the southern monsoon and added considerably to the depth of the morass, but the next day the weather cleared again. In the evening the Artillery Officers reported that they had only ammunition left for two days. Intelligence was also received that Salabut Jung was advancing from Beywarra. It was now no longer possible for the Force to retreat by the way it had come, harassed as it would be by Salabut Jung's numerous Cavalry supported by the Army of Observation and the garrison of Masulipatam. The European troops might have been embarked on the Hardwicke and Pilot sloops but it would have been difficult to have arranged for the Sepoys, and the Allies must have been abandoned, a proceeding which Colonel Forde considered too disgraceful to be entertained. He therefore determined to storm the Fort, judging that the garrison would not suspect that such an attempt would be made at a time, when owing to the recent rain, the approach over the morass had been made more than usually difficult. He accordingly ordered the fire of the Batteries to be kept up with greater vigour through the next day and all the troops to be under arms at ten on the night of the 7th.

the Company, the right of the Sovereign to distribute was reserved. Subsequent to the capture of Masulipatam it became the custom of the Company, to give to the captors the whole booty where it was at their disposal, and where this was not the case, such part of it as might be awarded to the Company by the Crown.

the besieged had a large supply of guns in store, ready to replace those that might become unserviceable, whereas the English could replace theirs by 9 pounders borrowed from the Hardwicke useless guns belonging to the Raja.

No sooner had Colonel Forde reached Masulipatam, than Rocher marched to Rajamundry where the sick of the English amounting to 25 Europeans and 40 Sepoys, had been left under Bristol, who had moreover just received a large sum in gold and which had been sent from Bengal for the use of the force. On hearing of the approach of M. Du Rocher, Mr. Bristol sent away the troops to the Dutch factory at Coconada, and directed such of his men as were capable of doing so to make the best of their way to Vizigapatam. M. Du Rocher after taking possession of Rajamundry advanced towards Vizianagram the capital of Anundeeraj, giving out that he intended to attack that place and the English factory at Vizipatam; his real object was to extort money from the neighbouring chiefs, but finding he could not collect enough to pay the expenses of his troops, he retraced his steps and marched to join the Army of Salabut Jung.

Alarmed by the movements of M. Du Rocher, no persuasions could induce the Raja to advance his credit or money for the wants of English troops, which were now most urgent. No money remained in the chest, and Colonel Forde had borrowed all the money that the officers of the force possessed, and had even used the prize money of men, whose pay moreover was several months in arrears. Under these circumstances, and perceiving the obstacles which must be surmounted before they could take the Fort, the troops became dispirited. At last the distress became so great, that the European Battalion broke into open mutiny, and on the 19th March turned out with their arms, and threatened to march away. Colonel Forde with much difficulty, prevailed upon them to return to their tents, and to select deputies to explain their complaints. The deputies declared that they were all determined not to serve a longer, unless they were paid their arrears, as also the prize money due to them and were assured of receiving the whole of the booty in case Masulipatam should be taken. Colonel Forde promised to pay them their arrears of pay as well as their prize money out of the first supply of money he should receive but explained that as according to the regulations authorized by the Crown, half only of the prize money taken in any Fort was to be given to the Captors, the remaining half belonging to the Company, he was unable to break through the regulation but promised that in consideration of their services and the hardships they had undergone, he would solicit the Company to give up their share of what might be found in Masulipatam, and that he would retain the amount until their decision was known.* These promises appeased the

* By letters patent from the Crown, dated the 14th January 1758, the East India Company were entitled to all booty and plunder taken solely by their forces or ships. When the land or sea forces of the Crown might be engaged conjointly with those of

with their usual ardour. Such however was the proposal of Colonel Forde that the
25th of the month, eighteen

sent letters forward desiring
Narsopore to leave the English and
information was received that he had
Masulipatam. Anundeeraj now
the following morning intending
the other side of the Godavery.
representing the folly of his
Lascity of Salabut Jung on the one
the other, whereas by remaining with
would be well, and if com-
support and assistance. The
be gainsayed, and he returned to
Forde unwilling to lose any chance
now asked permission to send
the objects of the English, and
was sent to his Camp on the

on the 25th March and made
these however were as quickly
on the 31st of April a severe storm of rain
descended and caused considerably to the depu-
tation of the weather cleared again. In the
mean time it was known that they had only arrived from
and received that Salabut Jung
no longer possible for the
in the camp and harassed as it would be by
the Army of Oudh
The English troops
and I have said it would
the Sepoys and the A
of the British and French volunteers
there descended to Korm
which will no sooner than four or
the people to the number of
more than half a mile
the distance of the fort
and in the course to be longer

of the
, and
ies of
of the
they
ptain
d the
the
, the
the
the
last

ox's
uld
the
ne,
er-
nd
he
ed
is
ne
er
ic
h,
ey
n
s
e

d
n
ie
of
ie
n
w
nd
en
ad
he
he
ly

The depth of water in the Ditch of the Fort depended upon the state of the tide, and as the ebb was to take place at midnight, it was calculated that there would not be more than 3 feet of water in it at that time, this circumstance coupled with the fact of their being no glacis nor any outworks greatly facilitated the approach to the breaches. Although the garrison had constantly repaired in the night the damage done during the day, the continued heavy firing on the 7th had it was thought made the breaches practicable, and all the Bastions had been equally fired upon so as to confound the enemy as to the intended place of assault.

On the other side of the Fort, in the south-west angle between the Bastion resting on the inlet, and which was named the St. Michael, and the one to the north of it called the Saline, there was no ditch, this portion of the works being covered by a swamp which was considered sufficient defence. A native servant of Captain Yorke's, who had lately lived in Masulipatam, told his master that he had sometimes seen the natives employed in the Fort wading over the swamp between the two Bastions. On hearing this intelligence, Colonel Forde permitted Captain Yorke and Captain Knox to examine this passage. On the night of the 6th these two officers disguising themselves as natives and taking 100 Sepoys with them, proceeded quietly to the spot, and placing the sepoys in small parties behind one another so as to cover their retreat, entered the quagmire which they crossed and found was not more than knee deep but the mud very tenacious, and the passage though practicable, a matter of difficulty. Before morning they returned undiscovered and their report determined Colonel Forde to attempt an attack on this point, which at all events would serve to distract the enemy's attention from the main assault. With the same intention the troops of the Raja were to march along the causeway over the morass, and on each side of it, and attack the Ravelin.

The Battalion of Europeans reinforced with 30 sailors from the Hardwicke, all the Artillerymen, and half the Sepoys were allotted for the real attack which was to be made on the north-east Bastion called the Camelion. The number of Europeans was 346 rank and file, the Sepoys numbering 700, consisted of the 2nd Battalion of Bengal Sepoys under Captain Mac Lean and a detail of Madras Sepoys. Captain Knox was appointed to lead the false attack having under him his own Battalion of Bengal Sepoys, and the remainder of the Madras Sepoys, together amounting to about 700 men. No counter attack being anticipated, the Camp and Batteries were left under a guard of the Rajah's troops.

The party under Captain Knox, having farthest to march, started first, and making a long detour round the Fort arrived at their position and commenced their attack exactly at midnight. The Raja's troops, at this signal commenced their attack upon the Ravelin on the causeway, making a great noise, if they did nothing more.

The main attack was in three divisions ; the 1st consisted of the European and Native Grenadiers together with the Artillerymen, and was under Captain Fischer ; the 2nd of the other four companies of Europeans and the Sailors, under Captain Yorke ; and the 3rd of the remainder of the Sepoys under Captain Mac Lean. But when they were ready to move off, they were delayed by the absence of Captain Callender, the second in command, who had been appointed to lead the assault, but who was nowhere to be found ; after a fruitless search the troops marched off without him, crossing the Morass considerably to the north of the Batteries, and marching nearly in a direct line upon the Camelion ; as they approached the ditch they were joined by the Artillerymen who had remained in the Batteries until the last moment.

Before reaching the Ditch they heard the firing of Captain Knox's column, on which they marched on to the Fort as fast as they could sinking up to their knees in mud at every step while they were in the Morass, and being up to their waists in water when they got into the ditch. The leading division however succeeded in gaining the berme, and had commenced tearing up the palisades, when they were discovered by the enemy, who immediately assembled upon the breach, and opened a fire of Artillery upon them from the adjacent Bastions, the St. John's on the right and that called the Little Gate—a name derived from its having a small sally port in one face—on the left. This opposition only increased the ardour of the assailants, and whilst the first Division under Fischer was gaining the breach, the second, under Yorke, kept up a smart fire upon the Bastion of St. John, and Mac Lean's Division of Sepoys replied to that of the Little Gate. At length, but not without some loss, Fischer's Division forced its way up the breach, and gained complete possession of the Camelion, here they waited until they were joined by Yorke's when leaving it in possession of the Bastion they advanced along the rampart to their right, towards the Little Gate Bastion, with a view to clearing the northern face of the Fort.

On gaining possession of the Camelion, Captain Moran discovered a light field-piece with its ammunition which at his suggestion Captain Yorke ordered the gunners to turn and fire along the east face of the Fort, to sweep the ramparts on that side, and as soon as a number of the third Division sufficient to maintain the Bastion had come up the breach, he proceeded in the same direction, marching along the ramparts towards the Bastion of St. John. Just as he was starting he saw a body of troops advancing below between the foot of the rampart and the buildings in the town. These were a body of Sepoys who had been sent to reinforce the garrison of the Camelion by M. Conflans, who had taken post with the European Grenadiers and some other troops at the Arsenal, which was situated on the south side of the Fort near the Francois Bastion. Captain Yorke on observing these troops, immediately rushed down, and seized the French officer at their head, and bid him order his men to lay down their arms, which they did, with apparently

little reluctance, when the whole were made prisoners, and sent up into the Camelion, where they were placed under the care of the third Division.

Captain Yorke perceiving that the road below was free from obstruction, and broader than the rampart above, resolved to march along it, to gain possession of the remainder of the defences allotted to his attack, accordingly he brought his Division down, excepting a few to guard the prisoners and the Artillery men with the gun. The guard in the St. John Bastion consisting of 20 Frenchmen and a larger number of Sepoys, had sheltered themselves from the fire of the field piece, but as soon as Captain Yorke's Division came under the Bastion they advanced to the edge of the rampart and fired down upon them, killing several, and wounding more, and then immediately cried out that they would surrender. Notwithstanding their treacherous conduct, Captain Yorke generously spared their lives, and gathering their arms sent them under an escort to the Camelion where they were made over to the third Division from which a small detachment was brought to secure the St. John Bastion. The Division then pushed on to the Dutch Bastion, which was held by a garrison of the same strength, as that in the St. John's, and who behaved in exactly a similar manner, firing a volley on the party as it advanced, and then immediately surrendering. They met with the same humane treatment, and were in like manner sent prisoners to the Camelion, from whence another detail was withdrawn and with a few Europeans left to maintain the Dutch Bastion.

The Division now moved on to the next Bastion, the Francois situated on the iulet at the south-east angle of the Fort, but had not advanced many paces, before they discovered a small Magazine built under the rampart which some of the party entered, and a man calling out a mine the whole division was seized with a panic and in spite of the exhortations of their officers rushed back in confusion towards the Camelion. Captain Yorke who marched at the head was left alone with two black drummers, whom he made beat the Grenadier's march but in vain for none rejoined him, on which he went back and found all his men in the greatest confusion some even proposing to evacuate the Fort. As soon as he was on the Bastion, he went to the head of the breach, and threatened to put to death any man who ventured to come near it, on this, some of the men who had served with him in the 39th Regiment, and had enlisted into the Company's service, cried out that their Captain was ill used, and offered to follow him wheresoever he pleased; their number speedily increased to 36, with whom he marched off, leaving the rest to follow as the officers could bring them on. This delay had given the Officer Commanding in the Francois time to make arrangements for their reception; he brought down a gun loaded with grape, and pointed it in the direction the party was marching, they were allowed to come within a few yards when the piece was fired with great execution, killing several, and wounding sixteen. Captain Yorke fell, with a ball through each of his thighs, and the two drummers were killed at his side. This loss, however, did not dis-

courage the men from bringing off their Captain whom they carried to the Camelion. The guards left at the Dutch and St. John Bastions were not dismayed by this reverse, but kept their ground waiting the result.

Colonel Forde had in the meantime proceeded with a reinforcement to the St. John Bastion and remained here, receiving reports from both Divisions and issuing such orders as were necessary. The prisoners were all sent to this Bastion, and as they arrived were sent down the breach into the ditch, and were guarded as well as the night permitted, by a party of Sepoys, with orders to fire upon the first man that moved.

All this time the Raja's troops kept up an incessant fire upon the Ravelin on the causeway, and although it did but little execution, had the effect of distracting the garrison and detaining a portion of their force in that outwork, which would have been better employed in the defence of the Fort itself. The false attack under Captain Knox had also called off the attention of a considerable body of the defenders, he had found the French so well prepared in this quarter that he had been unable to cross the swamp, and therefore had been compelled to content himself with keeping up a heavy fire upon the ramparts, but now owing to the time he had been engaged, his ammunition was beginning to run short.

The separation however, of the main attack into two Divisions sweeping round the Fort in opposite directions, distracted and confused the garrison more than the attacks from without, M. Conflans not knowing what to do, continually receiving messages magnifying the danger and sending orders which fresh reports continually induced him to countermand.

After gaining possession of the Camelion, the leading Division as has already been stated turned to their right, and proceeded along the rampart to the Little Gate Bastion which was in such bad repair that a party of Sepoys under Captain Mac Lean tried to climb up to it from the berme ; on seeing Captain Fischer's Division approaching, the guard in it fled to the next Bastion which was called the Church-yard, from whence they kept up an irregular fire, until Captain Fischer drew near, when they asked for quarter which was granted. The north-side of the Fort having been thus cleared, the Division now moved down the western side to the Great Gate Bastion which communicated with the detached Ravelin. The Fort parade ground was immediately under this Bastion, and as it was the rendezvous in case of alarm, a body of officers and men, numbering about 100, had assembled here, waiting for orders. Upon perceiving the advance of Fischer's Division they joined the guard in the Bastion above, and commenced an ill directed fire upon the English, who reserving their fire, advanced steadily until they were within a few paces of the French, when they fired a volley and then with a rapid charge soon cleared the Bastion. Fischer at

once sent down a party of men to secure the gate below, and thus shut out the troops in the Ravelin, and prevented the escape of any from the Fort. Whilst Fischer was making preparations for a further advance Captain Callender suddenly appeared—no one knew from whence,—and taking the command marched at their head towards the next Bastion which was called the Pettah, from which a few shots were fired, one of which killed Captain Callender. Immediately after this, the fire of the garrison in all other parts of the Fort ceased, and soon afterwards came a message from Colonel Forde ordering Fischer's Division to discontinue the attack, as M. de Conflans had surrendered.

He had sent a message to Colonel Forde offering to capitulate on honourable terms, to this the Colouel replied that he would give none and that the garrison must surrender at discretion, and that if they continued to resist now that the place was taken, he would put every man to the sword. On receiving this message, M. de Conflans sent round to the various parties of French troops, desiring them to lay down their arms and repair to his quarters at the Arsenal, which was a spacious enclosure. As soon as all was quiet, the English troops were assembled on the parade under the Great Gate Bastion, and 100 Europeans with two guns and two Companies of Sepoys were sent to guard the prisoners until the morning : when all the troops who were in the Ravelin and the Battery on the other side of the inlet came into the Fort and were made prisoners.

The number of prisoners exceeded that of the assailants, amounting to 500 Europeans, of whom 100 were Officers, Agents of the Company and inhabitants of the better class. The loss of the French is not stated, but must have been heavy. Of the English, Captains Callender and Molitore, and a Lieutenant whose name has not been recorded, 22 European Soldiers and 50 Sepoys were killed, and 62 Europeans and 150 Sepoys wounded. The Raja's troops behaved better than had been expected, and had several casualties. A large supply of Military stores was found in the Fort, including 120 pieces of Artillery, one of which was a 32 pounder, and five 24 pounders. The public property and merchandise captured was considerable, but all the private property, with the exception of merchandise, was given back to the prisoners, and half the remainder was given to the army, the other half being reserved, pending the orders of Government, as had been promised by Colonel Forde.

The apparent improbability of the attempt was the principal cause of its success ; for the garrison being in daily expectation of the arrival of a reinforcement of troops under M. Moracini from Pondicherry, had concerted that the Army of Observation joined by this reinforcement and a large Division, if not the whole of Salabut Jung's Army, should make a combined attack upon the British Army, which they looked upon as completely in their power and treated all its efforts with contempt.

Salabut Jung and M. Du Rocher now determined to wait for the arrival of the reinforcement expected from Pondicherry, when they hoped to compel the English to compound for their safe retreat by the surrender of Masulipatam.

On the morning of the 15th, two ships appeared standing into the road under French colours, and in the night they sent a catamaran with letters to M. de Conflans stating that they were the Haarlem and Bristol* from Pondicherry with 300 Europeans and Topasses on board under M. de Moracinc. Receiving no answer, they suspected what had happened, and early the next morning stood out to sea after the Hardwicke, which had dexterously managed to escape them, and was making her way to Bengal.

Salabut Jung despairing of retaking Masulipatam, now entered into negotiations with Colonel Forde; a treaty was accordingly prepared and signed on the 12th May, the advantages of which were entirely on the side of the English; a territory extending 80 miles along the coast and 20 miles inland was ceded to them, yielding an annual revenue of four lakh's of rupees. The troops under M. Du Rocher were to be compelled to cross the Kistna within 15 days, and the French were not to be permitted to have any settlement in the Deccan, nor were troops of that nation to be entertained by the Nizam, it was further agreed that Anundeeraj was not to be molested, and that each party was not to support the enemies of the other.

The Madras Presidency now assumed the direction of the newly acquired province and restored the English Factory at Masulipatam. They further directed Colonel Forde to proceed to Madras, with all the Europeans of his force, but Forde objected to complying with this order upon the ground that it would expose this important acquisition to recapture by the French fleet. The remainder of the Madras Sepoys however, who had gone round with Clive to Bengal, and whose numbers were now reduced to between 4 and 500, were sent back to their Presidency. At the same time about 50 Europeans from amongst the French prisoners were enlisted into the Company's European Battalion.

M. de Moracinc's Detachment landed at Ganjam on the 23rd April, but having expected to land at Masulipatam, had brought no camp equipage or any of the necessaries for a campaign. In this detachment were 43 British soldiers who had been taken prisoners at Fort St. David and had entered the French service; a few days after their arrival at Ganjam 30 of them deserted, and after enduring great hardships reached Cuttack from whence they were sent on to Calcutta. Seven more arrived in June, together with several deserters of various nations.

Colonel Forde, whose appointment to the command of the Company's troops in Bengal, had not been confirmed by the Court of

* This vessel had formerly been an English privateer but had been captured by the French.

Directors, embarked for Calcutta in October accompanied by Captain Knox, leaving the command of the Force to Captain Fischer the next senior officer. At this time the Europeans of the detachment owing to deaths and desertions only numbered 300, and by the return of the Madras Sepoys to their own Presidency the number of Sepoys was reduced to 800. Orders also were received for the return of the troops to Bengal, and they were directed to march along the coast and endeavour to destroy the party under M. de Moracin, either at Ganjam or wherever they could fall in with it.

Early in November M. de Moracin embarked with 40 men from Ganjam for Coconada, with a hope of being able to form an alliance with Juggapetteeraj who had formerly governed the country from the Godaveri to Coconada, but having joined the French had been deposed by the English who gave his territory to Anundeeraj All M. de Moracin's arguments failing to induce Juggapetteeraj to render any aid to the French, the troops from want of provisions were driven to plunder and most of them were either seized by the Zamindars of the district or took service with them; after enduring great privations, and with his party reduced to five or six men, M. de Moracin re-embarked on the 19th November, and returned to Pondicherry.

The French troops left at Ganjam, were estimated at 250 Europeans, of whom half were Topasses, and 100 Sepoys, and were under the command of the Chevalier Poete. Of the ships which had brought the detachment, the Haarlem had been sent to Arracan for provisions and the Bristol had been driven ashore in a gale of wind. There was however on the stocks in the river, a large snow which was rigged and manned with the stores and crew of the Bristol. The Chevalier embarking his troops on board the snow and two small sloops, sailed for Coconada where he arrived on the 19th December.

The state of the country owing to the rains would not permit of the English troops commencing their march before the middle of November, and then, owing to the waters of the Godaveri and other rivers not having abated, they were compelled to return by the route they had marched in the previous year, instead of by the shorter route along the coast. On their arrival at Rajamundry, they heard of the arrival of the Chevalier Poete at Coconada.

Captain Fischer at once proceeded with all practicable expedition towards Coconada. The Chevalier Poete had only landed 50 Europeans and the Sepoys of his Detachment, and these were encamped at a village inland, about two miles from the Dutch factory; as Fischer approached the place on the 27th December, he sent forward Captain Yorke with the European Grenadiers, and the 1st Battalion of Bengal Sepoys to prevent the embarkation of this party. The French, who were without any information, waited until they could distinguish Yorke's Detachment, when firing a volley they ran as fast as they could to the Dutch factory, into which they were admitted. Yorke at once

surrounded the factory, and Fischer coming up with the main body in the evening, invested it more closely, and peremptorily demanded that the French should be given up ; and the next day the Dutch, after a formal protest, delivered the French troops to the English. On the 29th, the Chevalier Poete with the remainder of his force sailed for Pondicherry where they arrived after a most disastrous passage.

From Coconada the English marched to Vizigapatam which they reached on the 16th January, and a few days afterwards, the whole of the Europeans were embarked on board of two ships for Calcutta, where they arrived at the end of the month. The Sepoys continued their march, arriving at Calcutta in March 1760.

Thus ended this most brilliant expedition, all the objects with which it was undertaken having been fully accomplished ; a complete victory was obtained in the field, the strongest Fort in that part of the country was captured ; and including prisoners and M. de Moracín's Detachment, at least 1000 Europeans and nearly 3000 Sepoys were subtracted from Lally's force and upwards of 200 pieces of cannon were captured. A valuable and extensive province was acquired for the Company and the French influence at the Court of the Nizam annihilated.

In October 1758 when the expedition sailed from Calcutta for the Northern Circars, the force left in Bengal amounted to little more than 300 Europeans, the newly raised 3rd and 4th Battalions of Bengal Sepoys and a few local Companies of Sepoys commanded by Sergeants. Towards the end of the year, the Warren arrived with 2 companies of the 79th or Colonel Draper's Regiment of Foot, but reduced as was the force in Bengal, Clive sent these two companies, in the vessel which had brought them, to Madras, and at the same time sent a considerable portion of some recruits who had lately arrived to aid in the defence of that place.

The following return dated 6th February 1759, which Clive sent to Colonel Lawrence on hearing that Lally had invested Madras, shows the strength of the European Force in Bengal on that date.

State of the European Force in Bengal, 6th February 1759.

Doing Duty.	Captains.	Lieutts.	Ensigns.	Sergeants.	Corporals.	Drummers.	Privates.	
Military ...	6	6	9	36	29	20	314*	* Whereof 130 are recruits.
Artillery ...	1	8	"	"	5	2	86	

In August 1759, rumours reached Calcutta that the Dutch Government at Batavia was fitting out a powerful armament, the destination of which was supposed to be Bengal ; they were however, discredited as not only was there no immediate prospect of war between Holland and England to justify any act of, or preparation for hostilities on either side in India, but the English had always treated the Dutch with the greatest consideration.

Shortly afterwards the rumours received support by the arrival of a Dutch ship in the river, having on board a number of European and Malay soldiers. In reply to Clive's remonstrances, the Dutch Governor at Chinsura assured him that the vessel had been driven by stress of weather from Negapatam her destined port, and that as soon as water and provisions had been supplied she would depart. In spite of these assurances however, it was deemed prudent to post troops at the Fort of Tannah and Charnock's Battery, which were opposite to each other on either side of the river, to stop and search all boats and vessels passing upwards. The Dutch Master attendant when passing up, refused to allow his boat to be searched, and struck the officer on duty at Charnock's Battery. For this he was put in the guard and on his boat being searched, 18 Malay soldiers were found concealed, these were sent back to the ship and the Master attendant released. Formal remonstrances against this proceeding were received from the Dutch, to which equally formal replies were sent. The vessel at length quitted the Hooghly and matters returned to their usual state of quiet.

In October, the intentions of the Dutch were put beyond a doubt, by the arrival at the mouth of the Hooghly, of seven Dutch vessels having on board 700 European and 800 Malay troops ; their garrison at Chinsura moreover numbered 150 Europeans, and reports were received that they were enlisting troops of every description at Chinsura, Cossimbazar and Patna.

The English force at Calcutta amounted to 250 European Infantry, 80 Artillerymen with some Lascars, and about 1200 Sepoys. There was a Company of European Infantry and 500 Sepoys at Patna, a Detachment of Europeans and a large body of Sepoys at Midnapore, and Detachments of Sepoys at Moorshedabad, Burdwan, and Chittagong. Orders were at once issued calling in these troops, but it was evident that matters would be decided one way or another before they could arrive. In addition to the regular Troops, there was at Calcutta a militia numbering about 300 men, of whom 250 were Europeans, the rest being Indo-Portuguese and Armenians. There was moreover a body of Volunteers from the more respectable class of Europeans ; from 20 to 30 of these were formed into a Troop of Horse,* and the rest into an Independent Company of Foot.

The only ships in the river were three Indiamen, the Calcutta of 761 tons, Captain Wilson ; the Duke of Dorset of 544 tons, Captain Forrester ; and the Hardwicke of 573 tons, Captain Sampson ; with the

* This was the first body of Cavalry the English ever had of their own in Bengal.

Leopard, a small snow, Captain Barclay, which vessel was sent off at once to Admiral Cornish, who was cruising off the coast of Arracan, requesting immediate assistance.

The three Indiamen were ordered to come up the river and anchor just above the Batteries, where fire boats and every thing needful to destroy the Dutch ships should they attempt to pass, had been prepared. The Detachments at the Batteries were reinforced by some of the best troops, together with some Volunteers from the Militia and Troop of Horse. Heavy Cannon were mounted on the Batteries, as well as on two faces of the new Fort.

Colonel Forde and Captain Knox most opportunely arrived from Masulipatam just at this time. The former Officer was in bad health, and had moreover cause for dissatisfaction against the Court of Directors for not having confirmed his nomination to their service ; but neither disgust at this treatment nor the state of his health, prevented his offering his services to his friend and patron at a crisis when they were so much required. To him Clive entrusted the command of the troops available for the field, and Captain Knox was placed in command of the parties at Tannah Fort and Charnocks Battery.

The Council at Calcutta were in doubt how to act ; they felt that to allow the Dutch troops to land and form a junction with the garrison at Chinsura was to permit the establishment of a rival and superior European Force in the province, which coupled with the recent conduct of the Nawab, was to submit to the certain ruin of the English power in Bengal. At the same time however, to prevent this,—which could only be done by force—was to commence hostilities with a power with which the mother country was at peace. In this state of perplexity, Clive states in his Narrative “ we anxiously wished that the next hour would bring us news of a declaration of war with Holland.”

The Dutch fortunately considering that the time for action had arrived, threw off the mask and commenced hostilities, thus relieving the Council of one of their greatest anxieties. They seized seven small vessels under English colours ; landed at Fulta and Raepore, attacked the English factories, burned the houses and destroyed the property of the Company, and finally fired upon and captured the Leopard carrying despatches to Admiral Cornish. From their conduct, Clive concluded that they had either received news of a rupture between England and Holland, or that they were now certain, either of the Nawab joining them or at all events remaining neuter, and his mind being now at ease, he prepared for active hostilities.

The defence of the new Fort having been entrusted to Mr. Howell with the Militia, Colonel Forde on the 20th of November seized the Dutch factory at Barnagore, and then, crossing the Hooghly with all the troops available for the field and 4 field-pieces, marched towards

Chandernagore, so as to keep a check upon the Garrison of Chinsura, and be ready to intercept the Dutch troops in the event of their disembarking and trying to reach that place by land.

In the meanwhile the Dutch ships were coming slowly up the river, as having no pilots they were obliged to proceed with great caution. On the 21st they anchored off Sunkeerel reach just out of cannon shot of the English Batteries. On the 23rd they landed the troops and then dropped down to Melaucholy point, just below which the English ships were at anchor. These vessels had been slowly following the Dutch and had been ordered to anchor above the Batteries ; but the Dutch Commodore Mylheer J. James Zuyland sent to Captain Wilson, who as senior officer acted as Commodore to the English ships, threatening to fire upon him if he attempted to pass, which the latter,—not having orders to engage—did not attempt. On hearing this state of affairs Clive wrote to Commodore Wilson directing him to send a protest to the Dutch Commodore demanding immediate restitution of the English property ; a full apology for the insults offered to the English flag ; and immediate withdrawal from the river ; if these terms were not complied with, which was not expected, he was to engage at all risks.

In obedience to these instructions, the demand was made on the 24th and at once refused. Upon this, the Indiamen weighed anchor, and notwithstanding the superiority of the enemy, who had seven ships*—four of which mounted 36 guns—to three, boldly advanced to the attack.

Captain Forrester, in the Duke of Dorset, commenced the action and took up his position along side the Dutch Commodore, and owing to the wind having failed, he was for some time unsupported, but after two hours close fighting he compelled his opponent to strike. The Calcutta and Hardwicke having in the mean time come up, opened so hot a fire that the two smaller vessels cut their cables and made off, one of them however was driven on shore. After the Dutch Commodore had struck, all the other vessels followed his example, with the exception of that of the second in command, who fought gallantly and got clear off, dropping down to Culpee, the English ships being too much crippled to follow. Here however he was captured by the Royal George and Oxford, Indiamen, which had just arrived in the river and having been met by orders from Calcutta were making their way up the river as fast as possible.

The loss of the enemy in this affair was considerable, amounting to over 100 men. On board the Dutch Commodore's ship, the Vlissingen, upwards of 30 men were killed and double that number

* The Vlissingen, Bleiswyk, Welgeleegen and the Princess of Orange of 36 guns each ; the Elizabeth Dorothea and Waereid of 26 guns, and the Mossel of 16 guns.

wounded ; not a man was killed on board the Duke of Dorset, but several were wounded and she received 90 shot in her hull, and her rigging was cut to pieces.

On the same day, Colonel Forde had marched from the French gardens to the northward, intending to encamp between Chandernagore and Chinsura. In passing through the former place he was suddenly attacked by the Dutch, who with four field-pieces, 120 Europeans and 300 Sepoys, had marched from Chinsura the previous evening and taken up a position amongst the ruins of Chandernagore. They were soon however dislodged, their cannon taken, and pursued with considerable slaughter to Chinsura. In the afternoon he was joined by Captain Knox, who on the landing of the Dutch troops had been ordered to join Colonel Forde with the troops from Tannah and Charnock.

The next day Colonel Forde heard of the near approach of the Dutch force and that in spite of his vigilance, they had been joined by a part of the Garrison of Chinsura. Having carefully examined all the neighbouring ground he deemed that it would be advisable to attack them on the plain of Bedarrah, but not liking to take upon himself the responsibility of attacking the troops of an European power with whom war had not been declared, he wrote to Clive stating his views and saying that if he had written instructions he could attack the Dutch with a fair prospect of destroying them. Clive received this note whilst playing at cards, and without rising, wrote on one of the cards with his pencil,—Dear Forde, fight them immediately, I will send you the Order in Council to-morrow."

Forde received this reply early in the morning, and at once marched to take up the position he had in view which was well adapted to develop the full advantages of his Artillery and Cavalry. It commanded the road to Chinsura, one flank was protected by a village, the other by a mangoe tope, both of which were occupied, and in front along the whole line was a narrow but deep nullah.

A small Detachment having been left to watch the garrison of Chinsura, the force placed in position consisted of 240 European Infantry, with 50 European Volunteers Horse and Foot, 80 Artillery-men with 4 field-pieces, about 800 Sepoys and 150 of the Nawab's Cavalry. At 10 o'clock the enemy appeared in sight; they were commanded by Colonel Roussel, a French soldier of fortune, and numbered 700 Europeans, 800 Malays, and a small body of newly raised Sepoys.

The Dutch were fatigued with their march and were totally unprovided with Artillery, but nevertheless they boldly advanced to the attack ; being cannonaded by the English directly they came within range, on reaching the nullah they were thrown into great confusion, upon which the English redoubled the fire of their Artillery and

Musketry. The action was short, bloody and decisive, in half an hour the enemy were completely defeated and put to flight, leaving 120 Europeans and 200 Malays dead on the field, 150 Europeans and as many Malays wounded, whilst Colonel Roussel, 14 other officers, 350 Europeans and 200 Malays were made prisoners. The troop of Volunteer Horse and the Nawab's Cavalry—which latter did nothing during the action—were now most useful in pursuing the fugitives, which they did with such effect that only 14 of the enemy succeeded in reaching Chinsura. The loss of the English was trifling. "The advantage of a "skilfully chosen position, the effect of a well directed and well served "artillery and finally the aid of Cavalry all tended to make this victory "so decisive and complete, in despite of the disparity of numbers."* Colonel Forde immediately after the action proceeded to Chinsura which he invested and sent to Clive for further orders. †

Overwhelmed by these disasters, the Dutch solicited a cessation of hostilities and expressed their readiness to enter into any terms. Judging that they had been sufficiently humbled, Clive acceded to their request. Deputies were appointed on both sides and the Dutch being willing to place themselves in the wrong, matters were speedily arranged. They disavowed the proceedings of their ships, acknowledged themselves the aggressors and agreed to pay 10 lakhs of rupees as compensation for the injuries they had done and the cost of the war, the English agreeing that on payment of the money the ships should be restored, as well as the prisoners, with the exception of those who wished to enter their service.

Three days after the action, Meerun, the Nawab's son arrived from Moorshedabad with 6000 horse, and seeing the turn affairs had taken, was breathing vengeance against the Dutch, who knowing his ferocious disposition, wrote to Clive begging him to intercede on their behalf. Clive at once went to the French gardens, and speedily brought matters to a satisfactory settlement. On the 5th December, a treaty was made between the Dutch and the Nawab, the former agreeing that on the restoration of the ships and prisoners taken by the English, they would at once send them away with all the European and Malay soldiers; that they would discharge all the troops they had raised in Bengal;

* Broome p. 270.

† Colonel Forde received no mark of recognition that his services were appreciated by the authorities in England, although Clive lost no opportunity of urging his claims upon the Court of Directors. Forde moreover had the mortification of being superseded by Coote, who had been his junior in the 39th Regiment. In October 1764, Clive wrote thus to the chairman of the Court of Directors:—"If Cailland should not go "to the coast of Coromandel, pray do not forget Colonel Forde, who is a brave, "meritorious and honest officer. He was offered a jaghire by the Subah of the Deckan, "but declined taking it upon terms contrary to the interest of the Company. Lord "Clive, General Lawrence and Colonel Coote, have received marks of the Director's "approbation and esteem; Colonel Forde has received none. The two Captains who "fought and took the Dutch ships in the Ganges received each a piece of plate; but "Colonel Forde, the conqueror of Masulipatam, who rendered the company a much "greater service by the total defeat of all the Dutch land forces in Bengal, has not "been distinguished by any mark of the Company's favour."

that they would never carry on hostilities, enlist or introduce troops, or erect fortifications in the province, and that the number of European soldiers to be maintained for their factories at Chinsura, Cossimbazar and Patna, should not exceed one hundred and twenty-five.

" Thus ended," says Clive, " an affair which had the event been different, threatened us in its consequence with utter destruction ; for had the Dutch gained the same advantage over us, we have now the most convincing proofs to conclude, that the remembrance of Amboyna would have been lost in their treatment of this Colony." * There is no doubt but that Meer Jaffier had originally given countenance to an intrigue with the Dutch, but the conduct of Clive, on the invasion of the Shah Zadah caused a change in his sentiments. †

In reply to repeated applications that more European troops should be sent to India, the Chairman of the Court of Directors writing to Clive, on the 11th November, 1757, states, " After being disappointed in raising recruits in Germany, Ireland, Scotland and England, His Majesty has been pleased to order us a Battalion of about one thousand

* Clive's Narrative p. 89.

† At this time Allum Gheer Sanee, or the second, occupied the throne of Delhi, but he was a mere puppet in the hands of his Minister Ghazee-u-deen Khan. The Shah Zadah referred to in the text, was the King's eldest son, Ali Gohur, better known by the name of Shah Allum, the title he assumed on ascending the throne. Impatient of the control in which he was kept by his father's minister, he fled from Delhi to Rohilkund where he raised his standard. Several chiefs inclined to support his cause, urged him to take possession of Bengal and Behar which they supposed, from the insecure position of Meer Jaffier, would prove an easy conquest. Having been joined by the Subadar of Oude, Bulwunt Singh the Raja of Benares, the Nawab of Tipperah, and other chiefs of influence, he commenced to make preparations for the invasion of Bahar. On news of these proceedings reaching Moorshedabad, Meer Jaffier in despair applied to Clive for aid. This Clive readily promised, and on the 25th February 1759, the English troops marched from Calcutta and reached Moorshedabad early in the ensuing month, they numbered 450 Europeans including Artillery and 2500 Sepoys ; during their absence, the defence of the Presidency was entrusted to the Militia and Volunteers, a small detail of Artillerymen, the sick and a few recruits of the European Battalion, and a portion of the 5th Battalion of Sepoys. Meer Jaffier remained at Moorshedabad, but the greater part of his army under the command of Meerun, marched with Clive for Patna on the 13th March. Clive in the meanwhile had received several letters from Ali Gohur, offering tempting rewards for his assistance, but Clive handed over all the letters to Meer Jaffier. On the 23rd March, the troops of the Shah Zadah made a general assault on Patna, but were repulsed with great loss. They then commenced the siege in due form, but the besieged, aided by the Sepoys attached to the English factory, defended themselves gallantly. On the 5th April, they were reinforced by a Detachment of Sepoys commanded by Ensign John Matthew, a young officer of great intelligence and ability, whom Clive, on learning the danger of the city had sent forward to its relief by forced marches. The Army of the Shah Zadah now raised the siege and commenced to retreat. On their first march they were joined by M. Law, and his Detachment, who at the invitation of the Prince had hastened to join him from Chutterpore in Bundelkund, Clive with the remainder of the English troops and the Nawab's Army reached Patna on the 8th, and a few days afterwards marched to the Karumnassa, and speedily reduced the country to order, and in June, having left a Company of European Infantry, a detail of Artillery, five Companies of Sepoys, which with the three local companies attached to the factory made a tolerably strong Battalion, returned with the remainder of the English troops to Calcutta. Before the end of the year, the Shah Zadah again renewed his attempt to conquer the province of Bahar, and an English force under Major Cailland was dispatched to oppose him.

" men out of the new Regiments." The command of this regiment which was numbered the 84th was given to Coote, who on returning to England with fortune and reputation had been promoted to the rank of Lieutenant Colonel. He was now appointed to succeed Clive in the command of the company's troops in Bengal, but with permission to stop and serve with his Regiment on the Coast should it be deemed necessary.

Clive had determined upon returning to England, and having ascertained that Colonel Coote could not be spared from the Coast, he applied to the Madras Government for permission for Major Cailland of the Madras service, an officer of reputation and considerable ability, to come round to Bengal to take command of the troops in that Presidency on his departure for England. Accordingly two days after the battle of Bedarrah, Major Cailland arrived at Calcutta, bringing with him 200 Europeans, chiefly foreigners and recruits.

In the following month the European detachment under Captain Fischer returned from the Northern Circars, and as a considerable number of the European prisoners taken at Bedarrah—a large proportion of whom were Germans—entered the Company's service, the strength of the European force in Bengal was brought up to 1000 men. The Native force consisted of five Battalions of 1000 men each.

Having arranged that Mr. Vansittart of the Madras service should succeed him as Governor, Clive considered it necessary that steps should be taken for opposing the advance of the Shah Zadah ; for this purpose he ordered Major Cailland to march from Calcutta in the middle of December with 300 European Infantry, 50 Artillery with 6 field pieces, and a Battalion of Sepoys. Major Cailland reached Moorshedabad on the 26th December where he was ordered to halt until the arrival of Clive, who arrived on the 6th January, and introduced the Major to Meer Jaffier as the Commandant of the English forces, and an officer in whom he placed implicit confidence, which he trusted the Nawab would do likewise. Here he directed the Battalion of Sepoys stationed at Moorshedabad to join Cailland's force. After some delay occasioned by the difficulty of raising money for the equipment of that portion of the Nawab's Army under the command of Meerun which was to accompany the Major to Patna, the Army, consisting of 15,000 Horse and Foot with 25 pieces of Artillery, marched from Moorshedabad on the 18th January. Clive having taken his farewell of Meer Jaffier, returned to Calcutta on the 14th.

Having completed all his arrangements, and made over the Government to Mr. Holwell pending the arrival of Mr. Vansittart from Madras, " Clive sailed from India on the 25th of February, 1760, rich both in fame and fortune, far beyond any European who had ever visited that country. His departure was viewed with regret by many, and with apprehension by all who were interested in the prosperity of the British nation. He left a blank that could not be filled up." " It appear-

"ed," (to use the strong and expressive language of a contemporary observer,) as if the soul was departing from the body of the Government of Bengal."*

(To be Continued.)

Note.—The authorities chiefly consulted in the compilation of this Chapter are ; Orme's Military Transactions in Indostan—Ive's Voyage from England to India and operations of the Squadron and Army in India under Admiral Watson and Colonel Clive in the years 1755,1756,1757, ; William's History of the Bengal Native Infantry : Malcolm's Life of Lord Clive ; Amber's Rise and Progress of the British Power in India ; Broome's Rise and Progress of the Bengal Army ; and Nolan's History of the British Empire in India.

* Malcolm's Life of Clive II. p. 143.

II.

NARRATIVE OF THE EXPEDITION FROM INDIA TO EGYPT
IN 1801.

COMPILED FROM

*"The Life of Sir David Baird," "the Memoirs of the Count de Noé,"
and the "Asiatic Annual Register."*

BY

COLONEL MALLESON C. S. I.

On the 5th February 1801 Major General David Baird, at the time commanding the Dinapore division, received orders to repair at once to Trincomali, there to assume the command of a force assembled with the object of capturing the island of Java, and, on the completion of that task, of attempting the reduction of the isles of France and Bourbon.

The force to be employed on this service consisted of the 10th, 19th and 80th regiments of the line, of detachments from the 86th and 88th, of a Corps of Bengal Native Volunteers, and of two companies of European and Native Artillery with lascars attached.

The most minute instructions regarding the movements of the force had been detailed by Marquess Wellesley. After Java should have been captured General Baird was to remain there as Lieutenant-Governor, whilst his second in command, Colonel the Hon'ble Arthur Wellesley, should proceed towards the islands.

The same day, the 5th February, General Baird embarked on board the Hon'ble Company's ship *Phœnix* but before that vessel had left the Saugor roads, Marquess Wellesley received a despatch from the president of the Board of Control, the effect of which was to entirely alter the destination of the expedition.

In that despatch Mr. Dundas informed the Governor General, that Sir Ralph Abercromby had received orders to proceed up the Mediterranean and, by an attack on Alexandria and the coast, to co-operate with the Turkish army assembling in Syria, in whatever plan might be concerted with them for expelling the French army from Egypt; and that it had been thought expedient "that a force should be sent also from India to act in such a manner as might appear conducive to that essential object," from the side of the Red Sea.

Mr. Dundas added that, with that object in view Sir Home Popham, with a proper squadron, would be immediately sent into that sea, taking with him a regiment from the Cape of Good Hope; that his first

rendezvous would be the Port of Mocha ; and he directed that a force of about 1000 Europeans and 2000 Native Infantry should be sent at once from India to the proposed place of rendezvous, with as little delay as possible, to co-operate with Sir Home Popham.

Copies of this despatch were sent to the presidencies of Madras and Bombay, the Governors of which were instructed to make the necessary preparations without delay, and even to carry the orders into execution without waiting for the Governor General's directions, if they were ready in other respects.

The despatch concluded by expressing a belief that unless anything unforeseen should occur the armament under Sir Ralph Abercromby would reach the coast of Egypt in December, and that that of Sir H. Popham would arrive at its destination in the February following. The Governor General was therefore earnestly recommended to despatch the Indian Contingent as quickly as possible; not even to wait till the troops should all be collected if it would save time to forward them in two or three distinct detachments.

Lord Wellesley received this despatch,—dated the 6th October 1800 and forwarded overland—on the 6th February. The same day he intimated to General Baird that a despatch from England would probably render it necessary for him to make some essential variations in the object of the armament he had equipped; meanwhile General Baird had better remain on board the *Phœnix*, urging the Captain, however, to make every necessary preparation for sailing, as he hoped to send the further instructions within forty eight hours.

But it was not till the 10th that the Military Secretary to the Governor General intimated to General Baird, in a short note, that the despatch from England had rendered it necessary that he should "assist Sir Ralph Abercromby in driving the French from Egypt instead of seizing on Batavia." The same evening Marquess Wellesley forwarded his instructions, accompanied by a very handsome and friendly letter, to General Baird.

These instructions and letters were received by General Baird on the afternoon of the 13th. The *Phœnix* sailed the same day for Trincomali; but before she reached her destination events had occurred to which it is now necessary to refer.

Colonel Wellesley, appointed second in command of the expedition against Java and the islands, was already at Trincomali when a copy of Mr. Dundas's despatch of the 6th October, reached the Madras Government. This copy was at once forwarded to Colonel Wellesley who determined, in consequence, to proceed at once with the troops under his command (excepting the 19th Regiment for which he could not procure tonnage) to Bombay, and thence to the place of rendezvous pointed out in the despatches from Mr. Dundas. He accordingly embarked with the troops from Ceylon on the 14th February.

Colonel Wellesley reached Bombay about the middle of March. He at once communicated with the Governor, and sent off to Mocha a detachment of Bombay troops under the command of Colonel Ramsay of the 80th Regiment. He then set to work to prepare transports for a second detachment, and the progress in this respect had been considerable when General Baird, who, on missing him at Trincomali, had pushed on in the *Wasp* gun-vessel, joined him on the 31st March.

So indefatigable indeed had been the exertions of Colonel Wellesley that on the 3rd April the second detachment of the force under the command of Colonel Beresford of the 88th Regiment, was able to sail in six transports from Bombay. On that very day Colonel Wellesley was attacked by intermittent fever, and on the 5th the medical officers declared that it would be utterly impossible for him to sail then with the expedition though he might possibly be able to follow in time to catch up the second division.

This second division consisted of the troops which General Baird had found at Trincomali ; which had started from that port for Mocha.

General Baird himself left Bombay on the 6th April and reached Mocha on the 24th. On his arrival there he found that Colonel Murray, who had been despatched to that place several months before, had sailed for Jeddah on the 17th, having on the 12th sent on Colonel Ramsay's detachment. He found likewise that Colonel Beresford's detachment had arrived on the 21st and sailed again on the 24th.

General Baird, fearing lest these two detachments uniting at Jeddah might make a premature attempt upon Kosseir, which place in default of Suez which at that season it would be impossible for him to reach with sailing ships, he had designed as his base of operations, sent off directions to Colonels Murray and Beresford to remain at Jeddah until he should join them with another detachment under Lieutenant Colonel Montresor of the 80th Regiment. That detachment reached Mocha on the 38th April. Leaving at that place despatches detailing the arrangement he had decided upon for Colonel Champagné, commanding the detachment still due, for Colonel Wellesley, and for Sir Home Popham expected from England, General Baird set out for Jeddah, with Colonel Montresor's division, on the 30th.

He reached Jeddah on the 18th May. There he found that his despatches had arrived too late to be communicated to Colonel Murray ; that that officer taking with him the Bombay detachment under Colonel Ramsay and the division under Colonel Beresford, had sailed up the Gulf towards Suez. Baird's first impulse was to follow them ; but he was restrained by the necessity which existed to take in a supply of fresh water,—the tanks having run very low. He availed himself of the delay thus caused to endeavour to secure by every means in his power, the friendship and co-operation of the chief authorities at Mecca.

On the evening of his arrival Baird received intelligence of the victory gained on the 21st March by Sir Ralph Abercromby over the French troops under General Menon.

On the 24th, General Baird was on the point of sailing from Jeddah when Sir Home Popham arrived in H. M. S. *Romney* 50 guns, with the sloop *Victor* in company, closely followed by the division he was escorting from the Cape. This consisted of H. M's. 61st Regiment, commanded by Lieutenant Colonel Carruthers; several troops of the 8th Light Dragoons, Captain Hawkers, and a detachment Royal Artillery, Captain Beaver; Sir Home Popham brought however no intelligence regarding Colonels Wellesley and Champagné. Nothing had been heard at Mocha either of them or of the provision ships that were to precede or accompany them when Sir Home Popham touched at that place.

On the 26th May Baird sailed from Jeddah with Sir Home Popham in the *Romney*, and reached Kosseir on the 6th June. He found there Colonel Murray, and the troops that had accompanied them.

The force then under his orders was composed as follows :—

Royal Artillery		... Captain Beaver.
Bengal Horse Do.		... Captain Browne.
Bengal Foot Do.		... Captain Fleming.
Madras Do. Do.		... Major Bell.
Bombay Do. Do.		... Captain Powell.

Royal Engineers, Bengal	do.	Madras	do.	Bombay	do.
Madras Pioneers.					

H. M's. 8th Light Dragoons		... Captain Hawkers.
" 10th Foot		... Lieutt. Colonel Quarril.
" 61st Foot		... Lieutt. Colonel Carruthers.
" 80th Foot		... Colonel Ramsay.
" 86th Foot		... Lieutt. Colonel Lloyd.
" 88th Foot		... Colonel Beresford.
Bengal Volunteer N. I.		... Captain Michie.
1st Bombay Regt. N. I.		... Major Holmes.
7th ditto ditto		... Major Laureston.

The respective quota furnished by the different establishments to which these corps belonged, is thus to be divided :

	Men.
East India Company's Artillery	... 448
Ditto Native Troops	... 1940
H. M's. Troops	... 2438
	—
Total	... 4826

To this must be added,

European officers	... 218
Native ditto	... 53
Drummers	... 125
Lascars	... 440
Servants, not soldiers	... 276
Public followers	... 572
Private ditto	... 305
Grand Total	... 6815

This force was commanded in chief by Major General David Baird, 54th Foot, who had as his Adjutant General, Colonel Achmuty 10th Foot, and as Quarter Master General, Colonel Murray 84th Foot. It was divided into two brigades, the Right and the Left, the former commanded by Colonel Beresford, the latter by Lieutenant Colonel Montresor.

General Baird's first act, after arriving at Kossier, was to place himself in communication with General Hely Hutchinson, commanding the British Army of Egypt after the death of Sir Ralph Abercromby. But his letter had been sent off only five days, when he received a despatch from General Hutchinson himself dated the 13th May, from Rahamenie on the Nile.

In this letter General Hutchinson stated that it was his intention to push on towards Cairo so as to prevent the French from attacking the Indian force before it should have effected its junction with the Grand Vizier ; that he had written to that high officer to give General Baird all the assistance he might require for the passage of the desert.

After alluding generally to the difficulties to be encountered from the climate and the people General Hutchinson added that he intended to continue in his position near Cairo until he should hear that the Indian force was in a state of security ; that he would then descend the Nile and besiege Alexandria ; that he rather opined that General Baird should join the army of the Grand Vizier and besiege Cairo with him, for which purpose he would endeavour to procure for him some heavy artillery as none could be brought across the desert.

To this letter General Baird replied that the Admiral on the station (Admiral Blankett) had pronounced the journey by sea to Suez at that season of the year to be impossible ; and that he was about to send off his Quarter Master General, Colonel Murray, to Keneh, where he would either remain, or proceed down the Nile to open a communication with General Hutchinson.

General Baird, in anticipation of a forward movement had already established military posts for nearly half the distance between Kossier and Keneh, and had directed the men forming them to dig for

water. At all these posts water had been found. The General determined therefore to push on a corps at once in advance, to be followed by others. The first of these corps commanded by Colonel Beresford left Kossier, therefore, on the 19th June.

The route they had to take may thus be concisely shewn:*

Kossier to the New Wells	... 11	miles, Water.
Half way to Moilah	... 17	" No water.
To Moilah	... 17	" Water & provisions.
Advanced Wells	... 9	" Water.
Half way to Segeta	... 19	" No water.
To Segeta	... 19	" Water & provisions
To Baromba	... 18	" Water.
To Keneh, on the Nile	... 10	" The Nile
<hr/>		
Total	... 120	

The march was encumbered with difficulties. The very first day many of the water bags leaked so much that all the water had escaped before the troops reached their destination ; the wells which had been dug there yielded indeed water, but it was procurable only in very small quantities. The dreariness of the country ; the depressing nature of the climate ; the burning sand and the burning sun ; all these added to the difficulties of the General, and called for the exercise of all his firmness, his presence of mind, and his fortitude.

General Baird had accompanied the two first detachments a part of the way. He then returned to Kossier to arrange measures for providing a water supply for the troops forming them. He had previously succeeded in obtaining about 5000 camels, and these he loaded with leathern bags or *mushuks*. In an order which he issued on the occasion will be found the means he had ascertained to be most efficacious for supplying the troops on the line of march with this necessary article.

After examining the various modes which had been suggested for ensuring a regular water-supply he announced the conclusion at which he had arrived that the army " must either trust to the puckallies, or find water in the desert, or re-embark."

The order then proceeded as follows : " Today's march of the 88th will decide the first point, and if it is possible to carry water, it should be done in this way.

" The 88th should take their bags on to Segeta, and after the next day's march thence, send them back to Segeta for the next corps.

* This itinerary is taken from the official orders signed by Colonel Moutresor and compiled after General Baird had himself made the journey between the two places. The list given in the Memoirs of Sir David Baird was written before the journey had been attempted and is incomplete and imperfect, *Vide Asiatic Annual Register for 1802.*

" The 10th should take their bags to Moilah, and after the next day's march send their bags back to Moilah for the next division. The Artillery, increased to a hundred puckallie camels, should take their bags one day's march to the wells, and send them back. By these three divisions of bags the whole army could, in succession, be supplied. Careful steady men should be appointed to each division, and the principle should be well explained to every body. A European officer should also go with each division of puckallies.

" If the puckallies will not answer and the 88th get on to Moilah, a company should be sent to clear the wells, seven miles from Moilah, and two companies should be sent half way from that towards Segeta to dig wells, and, as fast as they find water, more companies should follow.

" In the same manner the 10th should send two companies half way to Moilah and endeavour to dig wells.

" If water is found at these stations, the 88th must halt at Segeta, and send on two companies to dig wells between that and Keneh.

" The Sepoys at the stations may go and assist and the two companies at Segeta should immediately begin between that and Keneh."

General Baird had decided to leave Kossier for Keneh on the 27th June. On that day however he received despatches from Bombay informing him that Colonel Champagné's detachment would sail in six transports "in a few days," and that Colonel Wellesley was prevented by ill health from joining him.

A feeling of soreness had existed between General Baird and Colonel Wellesley since the date (5th May 1799) on which the former had considered himself superseded by the latter in the command of Seringapatam. It is interesting therefore to read the manner in which an ill-feeling on the part of Colonel Wellesley had been effaced by personal contact with General Baird in Bombay.

" As I am writing on the subject," wrote Colonel Wellesley in a private letter dated Bombay, 9th April, " I will freely acknowledge that my regret at being prevented from accompanying you has been greatly increased by the kind, candid, and handsome manner in which you have behaved towards me; and I will confess as freely, not only that I did not expect such treatment, but that my wishes before you arrived regarding going upon such an expedition, were directly the reverse of what they are at this moment. I need not enter farther into this subject than to entreat that you will not attribute my stay to any other motive than that to which I have above assigned it;" (the state of his health) " and to inform you that, as I know what has been said and expected by the world in general I propose, as well as for my own credit as for yours, to make known to my friends and to yours, not only

the distinguished manner in which you have behaved towards me, but the causes which have prevented my demonstrating my gratitude, by giving you every assistance in the arduous service which you have to conduct."

Colonel Wellesley accompanied his letter by a memorandum in which he detailed the course he would recommend the General, in command of the force invading Egypt from India, to adopt.

Dismissing as impracticable any attempt to gain Suez in sailing ships at that season of the year Colonel Wellesley indicated Kossier as the place of which the army should first gain possession.

After referring to the probable movements of the French troops and the disposition of the Mamelukes and the Beys, the memorandum thus proceeded.

" The first question which I shall consider, and which will lay the grounds for a consideration of, and decision upon others, is, whether it would be practicable or even desirable to cross the desert from Kossier at all, if that operation is not performed in concert and co-operation with a body of natives posted upon the Nile.

" It is needless to enter into a statement of the difficulties to be apprehended in crossing the desert ; they are certainly great, but I imagine not insurmountable. But, if it is not certain that the army or detachment which will cross the desert, will partake of the plenty of the banks of the Nile when they reach them ; if they should be certain of having water only, and such forage as their cattle should be able to pick up, I apprehend that the difficulty will become so great that the operation ought not to be attempted. It is impossible that the Mamelukes in Upper Egypt can be neutral in the contest in contemplation : they must take part with the French or with us. If they take part with the French, the army will be in the situation in which I have above described it, enjoying no advantage from having reached the banks of the Nile, excepting water, and probably some forage ; and it is needless to point out, that if the desert is to be crossed under those circumstances care must be taken not only to send with the body of troops which will cross a very large proportion of provisions, but means must be adopted to add to them until the operations of this body shall have given them such a hold of the country as to leave no doubt of their steady supply of provisions. It is obvious that this will require a great number of cattle, a number much larger than the Government of India, with all the zealous exercise of their power and means, can supply ; but there is another consideration connected with this subject besides the supply of cattle, and that is the means of feeding them when landed from the ships.

" Upon this point I need only call to the General's recollection the difficulties to which he has been a witness in moving large supplies of stores and provisions even in fertile, cultivated, and inhabited count-

ries, well supplied with water, and under every disadvantage of arrangement in the supply, in the distribution, and the food of the cattle, and draw a comparison between such difficulties and those to be expected in a march through a desert. But that is not the worst that is to be apprehended ; the cattle will of course land in a weak condition, in a desert, and it must be expected that even those which survive the voyage will starve or at least be in such a state before they commence their march as to render it very probable that they will not carry their loads to the end of it. Upon the whole, then, I am decidedly of opinion, that if the Mamelukes are not on our side, no attempt ought to be made to cross the desert.

" This opinion the General will observe is by no means founded on the impracticability of crossing with troops because I am convinced that it can be done ; but it is founded upon the danger that the troops will starve if they do not return immediately, and upon the inutility of the measure if they do.

" It may be imagined that (supposing the Mamelukes to be wavering) if an attempt is not made to cross the desert, the advantage of their co-operation will be lost. Upon this point I observe, that a knowledge of our strength (not of our weakness) will induce them to come forward, and it might be expected that the right of our weakness, occasioned by our march over the desert without concert with them, might induce them to take advantage of it, and to join the French.

" But those who will urge this consideration must suppose it possible that the Mamelukes can be neutral for a moment ; and this, their history from the beginning of time, particularly since the French invasion, will shew to be impossible.

" I come now to consider the propriety and mode of crossing the desert, supposing that the Mamelukes should be inclined to shake off the French yoke and to co-operate with us. The first point for the General to ascertain is, their sincerity in the cause, of which, as I have above stated, there is every probability. As soon as he will have ascertained this, it will be necessary that he should make arrangements with them for posting a supply of water on that part of the desert where it is most wanted, and for having a supply of provisions ready on the Nile ; and he might cross over a part of his army immediately. The first object on his arrival on the Nile should be to establish a post at Keneh, and, if possible, another in the desert between that place and Kosseir, in order to insure his communications between the Sea and the Nile. At Keneh, he should make the dépôt of his stores &c., which might be brought across the desert by degrees, and then he might commence his operations against the enemy.

" In the consideration of the question regarding the crossing of the desert I have omitted to mention the interruption which may be given to that operation by the enemy, because it is entirely distinct from the

difficulties which are peculiar to the operation itself. It is obvious, however, that if the Mamelukes are not on our side, and if they should not have driven out of Upper Egypt the small French force supposed to be in that country before the operation is attempted, that force, however small, will greatly increase the distress of the British troops who will cross the desert. I have not adverted to the supply of arms and ammunition to be given to the Natives. As long as their co-operation is doubtful, these supplies ought to be withheld but promised ; when they will have shewn their sincerity in our cause, the arms may be given to almost any extent."

On the third day after the receipt of this memorandum, viz : , the 30th June, General Baird quitted Kosseir. He had calculated that it would take him ten days to concentrate all his force at Keneh. Thence, should he be able to collect a sufficient number of boats, it might be possible for him to reach Cairo in twenty days. On the other hand, the land march from Keneh to Cairo would take, he believed, thirty-five days.

The difficulties of the march, owing to the want of water, the heat and the trying character of the soil, and the obstacles in the way of communication were so great that General Baird, lion-hearted as he was, despaired whilst waiting at Keneh for orders, of being able to effect anything useful to the public service. For many days he was without intelligence of, and received no orders from, General Hutchinson. Under these circumstances and dreading lest the breaking out of the monsoon might interfere with his return to India, he, on the 9th July, addressed from Keneh to H. R. H. the Duke of York, a letter expressive of his anxiety to know whether his continuance in Egypt was likely to be productive of any beneficial results to the service.

Just at this moment intelligence reached General Baird by a circuitous route that General Belliard, the French Governor of Cairo, had entered into a treaty with General Hutchinson. This information convinced General Baird that there could be no longer any necessity for his further advance, still less for bringing up more troops. Penetrated by this idea, he directed preparations to be made for the return of the force then at Keneh to Kosseir, and for its embarkation at the latter place.

But a few days later these views were destined to be altered. About the 22nd of July General Baird received from General Hutchinson a letter, dated the 10th Idem, in which that officer, after alluding to the want of information under which he had been labouring as to the strength and destination of the Indian force, stated that the French Commander-in-Chief, General Menon, had refused to receive the officer sent by General Belliard to lay before him the capitulation of Cairo, and that it was probable he would defend himself with great obstinacy and give a great deal of trouble ; that he should be extremely glad, therefore, to have General Baird's assistance and co-operation.

As to the mode of his advance and the means he should employ to effect it, General Hutchinson thus expressed himself : " I am thoroughly aware that from the season, and from the inundation, the march by land will be impracticable. You must do all you can to collect boats, but whether you should use force or not is entirely out of the question, because, for the last thousand years force has been the only law in this country, and the inhabitants are so little used to think for themselves that they are at a great loss how to act when it is not adopted against them."

He added, " I wish you to advance as soon as you conveniently can without pressing or fatiguing your troops ; you may march by detachments, and let them be ever so small there can be no difficulty in making your rendezvous at Gizeh which I have occupied entirely for your convenience. You have only to intimate your wishes to Colonel Stewart" (Commandant of Gizeh) " and every thing will be procured for you that the country affords."

With respect to his own movements General Hutchinson stated that his army had marched on the 9th and would arrive at Rosetta about the 29th. Thence he intended to proceed without loss of time to besiege Alexandria.

On receiving this letter General Baird lost no time in ordering all the troops up from Kosseir. Amongst those who responded to his call were four companies of the 61st Regiment, two of the 80th, the Horse Artillery from Bengal and the Artillery and Pioneers from Madras,—recently arrived at Kosseir. I may mention that Colonel Champagné and the provision ships had not even then arrived ; and that the *Susannah*, the ship in which Colonel Arthur Wellesley was to have sailed, was lost on her passage ! Never certainly was an attack of fever more opportune than that which prevented the future conqueror of Napoleon from taking part in this expedition !

On the 24th July General Baird despatched Colonel Quarrill with the 10th Regiment to Girgeh with instructions to enquire, on his arrival there, into the state of the roads and of the inundations ; he was further directed, that if he should find he could with safety proceed to Siout or to any town capable of furnishing adequate supplies for his troops, to march thither, and thence proceed in a similar manner as rapidly as he could towards Cairo, taking care never to expose himself to the chance of being overtaken by the flooding of the Nile at any considerable distance from a large town.

Colonel Quarrill was farther instructed, if he should find the roads impassable, to select some high ground, and wait the arrival of the river fleet with the General.

Having sent off Colonel Quarrill, General Baird proceeded to impress or otherwise procure boats. This was an easy task, and it was soon ascertained that the supply would exceed the demand. These boats

were of three sizes. One of the largest size was capable of carrying 150 men, three field officers, a proportion of officers junior to that rank, and their servants ; a medium-sized boat would contain 120 men ; and a small boat 35. It is stated that the 88th Regiment, consisting of 590 men and officers, with eight horses, took up seven boats of the different sizes above enumerated.

Having made all his preparations General Baird, appointing Colonel Murray to the command of the troops in Upper Egypt, and instructing him to remain at Keneh until the rear of the army should have come up and been sent on to Gizeh, embarked for that place on the 31st July.

Gizeh was reached on the 8th August. After having arranged for the comfort of his troops the General, on the 16th, shifted his quarters to Rhoda, a little island, a mile and three quarters long and one third of a mile broad, situated between Gizeh and Cairo and two miles from the latter. On the 27th having left a force under Colonel Ramsay to garrison Gizeh, he concentrated all his troops in the island.

It may not be out of place here to notice the effect which the sight of the Anglo-Indian army produced upon the Egyptians and Turks. The following passage extracted from the *Asiatic Annual Register* for 1802 may be accepted as giving an impartial view on the subject. "Whilst at Rhoda," writes the chronicler "the Indian Army had attracted much surprise and admiration. The Turks were astonished at the novel spectacle of men of colour being so well disciplined and trained. Indeed the general magnificence of the establishment of the Indian army was so different from what they had been accustomied to see in General Hutchinson's that the contrast could not fail of being striking. But General Baird proved to them also that his troops were not enfeebled or himself rendered inactive, by these superior comforts. Every morning at day-light he manœuvred his army for several hours, and in the evening again formed his parade. Never were finer men seen than those which composed this force, and no soldiers could possibly be in higher order."

On the night of the 27th August the right wing of the army began to move in the direction of Alexandria and, with General Baird at its head, reached Rosetta on the 30th. A detachment under Colonel Lloyd was about the same time sent to garrison Damietta, but in consequence of a difference of opinion with the Grand Vizier, commanding the Turkish army, it was withdrawn, the European portion of it being sent to Rosetta, and the native (four companies Bombay N. I.) to Gizeh.

On arriving at Rosetta General Baird and his force hoped to be able to take part in the siege of Alexandria, but their ardour was damped by the receipt of a letter from General Hutchinson, announcing that

the French had sent a flag of truce to him to treat for a surrender. General Baird was ordered to halt where he was.

On the 1st September General Baird called upon General Hutchinson in his tent. He learned from him that the capitulation had been actually signed and that the British troops were to take possession of the outworks of Alexandria the following morning.

The Anglo Indian army then disembarked and encamped at Abou-mandur, not far from Rosetta.

For some months the Indian Army remained encamped near Rosetta without orders either from England or from India. Meanwhile a difficulty arose. General Hutchinson had resolved to proceed to England and the British Government had replaced him by Lord Cavan. This officer declined to look upon General Baird as Commanding a separate force distinct from the British army, but desired to place him and his troops in the same alignment, as it were, as the troops who had come direct from England. To this General Baird objected assigning as one great obstacle to the success of such an arrangement the fact that the troops under his orders received Indian rates of pay, and that the money he had to dispose of as commanding the Indian expedition was the property, not of the Crown, but of the East India Company. General Hutchinson appeared to see great force in these objections; but he did not the less, on his departure the 6th November, make over command of the whole army, including the Anglo Indian force, to Lord Cavan.

Shortly after this, intelligence arrived of the signing of the preliminaries of peace between France and England, and at nearly the same time General Baird received from Marquess Wellesley a despatch, in which whilst expressing full approval of all his conduct, he intimated a wish that when the services of the army should be no longer required in Egypt, General Baird should return with his troops, or at least with such portion of them as it might not be necessary to leave in Egypt, to the nearest port in India.

On the 30th April, 1802, despatches were received from England directing that the Native troops, and a portion of the European troops on the Indian establishment, serving in India, should return at once to India by sea from Suez.

General Baird at once made the necessary preparations for evacuating the country. He ordered parties to be sent from Gizeh, to be stationed along the desert, in order to dig for water. He himself left Alexandria for Gizeh on the 7th May, and arrived at that place on the 11th. He set out thence, after an interview with the Pasha, at the head of his troops, for Suez, which place he reached on the 25th. The troops crossed the desert in successive divisions, in five easy marches

each, without experiencing much inconvenience, and with the loss of only three Europeans.

On the 5th June, General Baird and his army left Suez. The ship on which he himself was on board, H. M. S. Victor, reached Madras the 6th July, and Calcutta the 31st idem. On that day the Governor General published a congratulatory General Order, in which he made special allusion to the terms in which Lord Cavan had written regarding the Anglo-Indian force. As the language used was the result of personal experience during a considerable time, of a force serving under his own orders, I propose here to reproduce it.

Lord Cavan, alluding to the Anglo-Indian force, wrote : " Their excellent discipline and obedience and their patience under great fatigue and hardship, have been equalled by their exemplary conduct in the correct and regular discharge of every duty of soldiers ; and though they may lament that circumstances rendered it impossible for them to have taken part in the brilliant actions of this country during the last campaign, it must be a satisfaction for them to know that their services in Egypt have been as important, and as essential to their country, as those of their brother soldiers that gained such distinguished victories in it."

I do not think I can better conclude than by this testimony of the Commander-in-Chief of the Army of Egypt to the character and conduct of his two Indian Brigades this short narrative of the Anglo-Indian expedition to Egypt of 1801.

III.

NOTES ON THE HISTORY, MATERIEL, ORGANISATION AND TACTICS OF ARTILLERY.*

BY

CAPTAIN E. H. H. COLLEN (*late R. A.*)*Assistant Secretary, Government of India, Milt. Dept.*

The modern term, *Artillery*, is used in two senses. Firstly to designate the *materiel* of Artillery, i. e. the Guns etc. Secondly the personnel, and organisation by which the power of this arm is wielded. The subject Artillery naturally divides itself into four sections.

1. Historical.
2. Technical.
3. Administrative.
4. Tactical.

In tracing the gradual development of Artillery from its infancy to the present day, we must touch upon the progress made under the three remaining heads for it would be unprofitable to separate them. The second section will treat only very briefly and generally of the modern *materiel*. Under the third heading we propose to describe the systems of organisation which obtain at the present time, indicating the direction towards which the opinions of those most distinguished and enlightened in war bid us look for change. While in the fourth section it will be necessary to speak of the drill and uncombined tactics of Artillery rather than the general combined tactics of Artillery.

Historical.

The origin of the word "Artillery" is a matter of dispute. Some have suggested its derivation from "arcus" a bow, while others hold to the more probable derivation from "ars telaria" signifying bows, arrows and all implements of war.

We have scriptural authority for the "engines invented by cunning men to shoot arrows and great stones," probably the fore-runners of those machines which were known among the ancients as the catapulta, balista, battering-ram, &c. No historical resumé of the progress of artillery can be complete without a reference to these ancient machines applied to projectile, as distinguished from manual warfare, and the

* In a much more condensed form these notes, written in 1873, appear as the article *Artillery* in the *Encyclopædia Britannica* (new edition).

history of which brings us to the period when " Artillery" embraced the engine of a new power which was to revolutionise warfare, and ultimately to receive the deepest attention and study of the man of science as well as the man of war. We find that even in the 11th, 12th, 13th, and early part of the 14th centuries, various machines, such as the trebuchet, onager, scorpion and espringal, were used, whose action was dependent on the elasticity of twisted cords of various materials and power, to hurl stones, Greek fire, red hot iron etc.

In these early days we have no definite record of the arrangements made for the assemblage and service of these machines, and yet we find even then the prototypes of functionaries of later times. There were the Master Bowyer, the Master Fletcher, the Master Carpenter and the Master Smith, &c., who were chief mechanics holding patents and salaries from the Crown, and styled Officers of the Ordnance. These offices were soon lost sight of in the higher and important position of Master of the Ordnance, an official who continued under the title of Master-General up to a very recent date.

The introduction of gunpowder soon transferred the meaning of the word " Artillery" to those inventions which were to give effect to the new destructive agent. The old machines gradually but very slowly were replaced. " Artillery" no longer meant any projectile machine or engine, or as in France " archery," and now the term has widened out to embrace those who serve as well as the thing served, and from a narrow designation of rude and simple machines it now enfolds men and matter towards whose training or construction, elaboration and use, the highest endeavours of science have been devoted. Let it not be imagined, however, that the introduction of gunpowder effected any sudden revolution. In those days, as in later times, a new thing was opposed for its novelty, and we find men of experience affirming their preference for the old engines of war.

The history of gunpowder cannot be treated here. But a few words must necessarily be said on this branch of the subject.

From a careful consideration of the evidence it appears that there is every reason to presume that incendiary and explosive compositions were known to the Chinese and the inhabitants of India, before the Christian era. Doubtless also there were machines by which these incendiary compositions could be projected against an enemy, and these are probably what translators have erroneously termed, cannon. However this may be, European history affirms that guns and gunpowder did not come into practical use until the 14th century. Whether guns and gunpowder were used in India at an earlier date than in Europe cannot be discussed here. The belief that they were is apparently naturally founded on the previous knowledge possessed by Eastern Nations. It seems clear that the Moors were the first to introduce a composition resembling gunpowder into Europe, and that through the Saracens the art of making guns and a rough kind of gun-

powder was imported from India and China. That some composition resembling gunpowder had long been known to the alchemists of Europe seems decided, for in a manuscript of Marcus Graecus attributed to some date between the 9th and 12th Centuries mention is made of gunpowder, and suggestions for the use of that substance, and rockets in war. The popular controversy as to whether Roger Bacon (died 1292) or Bartholdus Schwartz (1320) both monks, can be called the discoverer of gunpowder may be disposed of by the statement, supported as it is by good evidence, that neither of them can be held to be the absolute *inventor* of the substance now known by the name of gunpowder, although it is possible that each independently in the course of their researches arrived at similar results, although we have nothing to show that any of their ideas as to the application of the substance to warlike purposes were carried into practical effect. To support the view of the Eastern origin of gunpowder and guns, we find, according to Condé, that the Moors in Spain used Artillery against Saragossa in 1118 A. D. and in 1157 A. D. defended Niebla by means of machines which threw darts and stones through the agency of fire. Artillery was used against Cordova in 1280 A. D., and in 1306 or 1308 Ferdinand II. took Gibraltar from the Moors through its agency.

The application of gunpowder to projectile warfare, and the use of cannon, or as we now generally term them, guns, may be taken to have commenced in England and Europe about the 13th and 14th Centuries.

It is stated by those well qualified to judge that the first unquestionable testimony of the employment of cannon is in 1338 in the reign of Edward III. but we have also records of the use of Artillery in the field in England in the reign of Henry III. during the rebellion of the Duke of Gloucester, A. D. 1267.*

In 1322 Edward II. lost his guns at the battle of Leylade in Northumberland† but it is not until the reign of Edward III. that we are able to trace any record of a Train or Establishment, which was embodied for the service of Artillery.

In the many battles and sieges which Edward III. undertook we find constant mention of the employment of Artillery. The pieces however probably bore as little likeness to our modern Artillery as the cross-bow to a breech loading rifle, as in the earliest days the guns appear to have been made of wood, leather, iron bars and hoops.

In A. D. 1344 we find the first detail of an Artillery organisation, and which was kept up both in peace and war from the 18th to the 21st year of Edward III.'s reign. In this detail which may be said to be the forerunner of the extensive and complicated organisation which

* Grafton's Chronicles.

† Rastell's, Holinshead's, and Grafton's Chronicles.

England now possesses in her Royal Regiment of Artillery, we see both Engineers and Artillery men included in a system which obtained up to a very late date. This ordnance or Artillery Establishment consisted of

- 28 Masons.
- 138 Carpenters.
- 1 Cooper.
- 13 Smiths.
- 57 Engineers.
- 24 Provisioners.
- 60 Waggoners.
- 7 Armourers.
- 12 Artillerymen and Gunners.

There seems to be some doubt whether Edward III. used guns at the Battle of Creci fought 26th August 1346. Froissart mentions the fact in one of his M. S. S. now in the Amiens library, the authority of Vilani a Florentine historian supports it, * and a passage in the Chronicles of St. Denis confirms the belief, while we know that "gunners and artillerymen" formed part of the force with which Edward took the field in this campaign. But on the other hand it is affirmed that the testimony is not strong, and the absence of any conclusive evidence in contemporary histories, the fact that the mention is merely an allusion, bids us doubt whether guns were really used at Creci. In 1347, Edward III employed a train of artillery and an Ordnance establishment of 314 men, and in all the numerous battles and sieges of his reign he seems to have made use of the old projectile machines and of the new, together. In the reign of Henry V. we have the detail of an Ordnance Establishment at the Siege of Harfleur 1415, and in it is included 25 Master Gunners, and 50 "Servitor Gunners."

The Gunner of these days seems to have been the Captain of the gun, and to have had general charge of the guns and stores, with the especial duty of laying and firing the piece in action. The gunners however bore but a small proportion to the artificers of these ordnance establishments. Thus in 1344 † there was a peace establishment of 340 men of which only 12 were gunners. But as guns began to take the place of the old machines, they appeared on the walls of castles and fortified places in England, and for their services a small local establishment of gunners was entertained, and we may see in this organization the first of the valuable body of men known as Master-Gunners and the Coast Brigade. These local or garrison gunners were under the Master of the Ordnance, though their pay was not charged in the Ordnance books but issued direct from the Treasury. It was only in

* Chron 1. 12 c. 65.

† History of the Royal Artillery, Duncan.

1771 that the garrison gunners were made part of the Royal Regiment of Artillery, as invalid companies, now represented by the *Coast Brigade*.

Such then was the state of things in England about the beginning of the 15th Century, and if the cannon of this period and the arrangements generally, partook of the backward state of the mechanical arts in England, the inefficiency and want of mobility of the early Artillery in this country may be taken as a measure of the progress on the continent. It would be impossible even to allude to the use of Artillery at the various battles and sieges of these times, especially in the present article which treats rather of the history of the organization than of the actual guns themselves. It must, however, be inferred that in those early times, the use of Artillery was centred in the unwieldy piece, while we have little or no record of the arrangements for its service or for the organization of the personnel which served.

The *Manufacturing Establishments* now so gigantic and powerful in England and other countries were at this epoch only represented by feeble private establishments. Piobert, however, states that Gun Foundries were established in France as early as 1377 though it was not until 1440 that we have any trace of them in Germany, while record is altogether wanting in England until 1521-43 when we read of the first brass and iron guns being cast. Progress began to show itself in the 15th Century ; the "bombards" were replaced by brass guns, and the cumbrous beds upon which the earlier ordnance were transported gave way to rude Artillery carriages on wheels ; iron was partly substituted for stone in the manufacture of projectiles, and generally there appears to have been some attempt to introduce greater efficiency and mobility.

It is in the reign of Louis XI. of France (1461) that one can trace the first guns furnished with trunnions. These guns were of bronze and transported on carriages in two separable parts, the originals of the present gun carriage and limber.

The first step towards a better organization, and some tactical system appears to have been made by Charles VIII. of France towards the end of the 15th Century. He made use of a numerous Artillery in his Italian campaign, and enjoyed the advantage of possessing guns very superior to those of his adversaries. Queen Isabella of Spain was foremost in Artillery progress by the organization of trains of Artillery and the establishment of gun foundries.

Louis XII. (1498) appears to have possessed Artillery which, comparatively speaking, had even at this time attained a considerable degree of mobility, for in the year 1500 he was able to transport his Artillery from Pisa to Rome, 240 miles, in a short time, and it is stated that the guns were sufficiently manageable to be moved rapidly from one point of the battle field to the other. When he recovered Genoa in 1507 he had 60 guns of large calibre for an army of about 20,000

men, and overcame the Venetians on the Adda in 1509 by means of his Artillery. Under Francis I. Artillery in France underwent considerable development. The tactics of the day however appear to have received little change under the influence of fire-arms. Deep battalions still engaged in hand to hand combats after a few discharges from the Artillery, the guns of which were usually disposed in large batteries at the centre and flanks, and scarcely ever changed their position. Francis I. adopted a lighter construction for field-guns, and had them drawn by the best description of horses. In the defeat of the Swiss at Marignan in 1515 "the French Artillery played a new and distinguished part, not only by protecting the centre of the army from the charges of the Swiss phalanxes, and causing them excessive loss, but also by rapidly taking such positions from time to time during the battle as enabled the guns to play upon the flanks of the attacking columns."* The French therefore may justly be regarded as the first nation to use Artillery tactically on the battle field.

In England during this epoch the progress in Artillery was not great. The guns were chiefly used at sieges, though we have instances of the employment of Artillery on the battle field. Greater interest, however, appears to have been taken in ordnance matters, and in 1456 it is stated on the authority of *Excerpta Historica*, p. 10, that a commission was issued to John Judd as *Master General of the Ordnance*, although it does not appear that this functionary exercised his authority. In 1482 Edward IV. prepared his Artillery to invade Scotland, and we are informed that 1000 soldiers were appointed "to attend on the Ordnance." In 1483 (Richard III) Rauf Bigod was appointed Master of the Ordnance, an office which continued down to the year 1852. These early Masters of the Ordnance were also commanders of the Artillery in expeditions and wars and were responsible to the reigning monarch for the due administration of all such personnel and matériel of Artillery as then existed.

Henry VII. and Henry VIII. did much to hasten the progress of Artillery. Tartaglia,† gives us tables of the different cannon in use about this time. The heavy pieces, culverins, &c. were drawn by oxen and corresponded to those now in use for siege, or position purposes, while the field guns appear to have been the 2, 4, 6½, and 8 pr. *falcons*, *falconets*, and *sakers*.

In 1544 an important artillery-train was organized for service in France, and in it we find no less than 281 Master-gunners and gunners,‡ besides conductors, drivers, artificers, &c. These trains were raised for a particular service, and contained only a small nucleus of permanent establishment. In England this permanent body consisted only of the Company of gunners at the Tower, numbering 58 in the

* Observations on Fire-arms, Chesney, 1852.

† Three books of Colloquies concerning the art of Shooting.

‡ Harl M. S. 5753.

reign of Edward VI, (1547-1553) and the various local gunners dispersed in the garrisons of England, giving not more than a total of 105 gunners. In 1557 an artillery train was despatched to the Netherlands, and in the detail of this train we find a "master of the carriages," "guides of the ordnance," a Chaplain and Surgeon, &c., 120 smiths, but only 12 gunners. In the same way on the Continent *trains* were formed by men withdrawn from the garrisons, supplemented by men hired for the occasion. The service of the guns was looked on as a mechanical art, certificates were given on the attainment of a certain degree of proficiency, and when the holders were enlisted in the service of a country, they were not allowed to teach without permission.* The trains had transport establishments attached, the cattle for which were hired. The train including its wagons of ammunition thus formed what is now known as the *artillery park*, a particular situation being assigned to it in camp and on the march. "On the march the train was, according to Grewenitz,† preceded by an advanced guard of light Cavalry to protect it. The first portion of this troop carried hatchets and saws; the second, instruments and implements for the construction of machines, the third, sledge-hammers, iron wedges and pickaxes; finally, the last were provided with pioneers' implements. After these came carriages loaded with guns, capstans, levers, and otherlike machines; they were followed by the light pieces, by the heavy siege guns, by ammunition wagons, by pontoons and the necessary men for them, by the artillery artificers, and lastly by the baggage."‡

In 1554 light guns with limbers were used at the battle of Remi, and as the guns were accompanied by Cavalry we may look on them as the first Horse Artillery. The latter part of the 16th Century was not wanting in military leaders in advance of their times who foresaw the position artillery would take in warfare. Maurice of Nassau, Prince of Orange, (1570-1625) a warrior of conspicuous military ability pushed forward the science of Artillery. Henry IV, of France, (1553-1610) Gustavus Adolphus of Sweden (1594-1632) were as the foremost leaders of their times, the natural champions of progress in Artillery at the end of the 16th and beginning of the 17th Century, as in all military matters. We shall speak of the improvements effected by these great men under the head of the 17th Century.

In England we find the ordnance Establishments progressing in numbers, and in Grose's Military Antiquities will be found § extracts from the Harl. M. S. 4685, detailing the duties of the Master of the Ordnance, &c.

In 1578 in the reign of Queen Elizabeth we are told that there were besides Master-Gunners, no less than 333 inferior gunners or Cannoniers on the permanent establishment, and in 1585 a Captain

* Owen's Modern Artillery.

† Treatise on the Organisation and Tactics of Artillery by Major Von Grewenitz.

‡ Owen's Modern Artillery.

§ Vol. I. p. 198—202.

Wilford is styled Captain of Cannoniers. In 1588 the detail of Artillery in an army appears to have been settled and the draught fixed.

In 1599 there were no less than 1600 gunners, cannoniers, Armorers and Clerks of the ordnance with Lord Mountjoy's army of Ireland.

The Artillery tactics pursued towards the latter part of the 16th Century were simple : the guns usually deployed on the leading gun in advance of the troops, fired a few rounds and from their want of mobility could neither advance to partake of a forward movement nor protect the retreat of the army as they were generally captured on the first advance of the enemy. In the "Ordinances of War"† of the Margrave Albert I, of Brandenbourg it is curious to note that the principle of masking guns was fully appreciated, and that the importance of bringing guns quickly into action was insisted upon. The guns were to be placed between the troops, but masked as much as possible so that they could be unyoked quickly and easily, and after fire, again yoked up for a forward movement.

In France during the religious wars in the latter half of the 16th Century, the Artillery seems to have declined in importance, and in the battle between Henry IV. and the troops of the League we are unable to trace the presence of more than a few light field pieces on either side.

In the continental wars generally however, and certainly in England, greater progress was made in the attack and defence of fortresses by artillery than in the development of field artillery. Vertical fire was used to a considerable extent, and seems to have been conducted by artificers, while the "Cannoniers" served the guns. The proportion which guns should bear to the strength of an army was then considered to be about 1 gun per 1000 men, or even a less proportion. But even with the comparatively small use made of guns, and the cumbrous matériel, the 16th Century must be considered the era from which dates the tactical history of artillery.

The 17th Century was in England unfruitful of any great improvement in artillery. In 1618 we have record of a small train of artillery composed as follows :

1. General of Artillery.
1. Lieutenant „ „
10. Gentlemen „ „
25. Conductors „ „
136. Gunners „ „
1. Petardier
1. Captain of Miners.
25. Miners.

† Grawenitz pp. 33-34.

1. Captain of Pioneers.
25. Pioneers.
1. Surgeon.
1. Surgeons' Mate.

In this train we see the association of gunners, and Sappers and Miners, an union which subsisted to a comparatively recent date. About 1620 there seems to have been an effort to ascertain the resources of the ordnance establishments in war matériel and we find a record of the Master-gunners of England, of the existence of the office of "proof-master" and that 200 scholars were "sworn to the practice of shooting in great ordnance."

In this year 1620 also a Royal Warrant gives the detail of the army which was to be raised for the recovery and protection of the Palatinate. The strength of the force was to be 30,000 with 22 guns as follow :

2. Brass Mortars.
4. Cannon royal.
4. Demi-Cannon.
6. Culverins.
4. Demi-Culverins.
2. Sakers.

with block carriages. This train included, engineers, miners, pioneers, artificers, &c., &c., the purely artillery staff being composed of

1. Master of the Ordnance.
1. Lieutenant " "
9. Gentlemen " "
1. Master Gunner.
2. Chief Petardiers.
3. Master Gunner's mates.
3. Constables or Quarter Gunners.
124. Gunners.

besides farriers, collar makers, drivers, &c. &c.

In 1639, the establishment of an Artillery-train for an army to be employed against the Scotch included "Commissaries of Magazines," "Conductors of the trenches," (engineers), a "fire worker," "petardier," "master-gunner," 4 "gentlemen of the ordnance," "gunner's mates" 30 "gunners," and 40 "mattrosses," with various artificers and labourers, and commissaries and conductors (drivers) for the transport branch. This establishment was to be for a train of 30 or 40 pieces.*

* Grose's Military Antiquities.

The commencement of the Great Rebellion in 1642, found the Artillery of England in a very feeble and backward state. Two books* by Artillerymen of those days give us much information on its progress, with suggestions of how to seize the enemy's guns and turn them against the opposing forces. At several affairs however the Artillery seems to have been comparatively useless and the presence of 25 guns on the Royalist side at Marston Moor was neutralized by Cromwell's flank attack. In the defeat of the Royalists at Naseby little was effected by the Artillery and here again we trace their inefficiency to the tactical incompetence of the army leaders, and the want of mobility of the guns.

There was little or no progress made in Artillery in England for the 40 years following the execution of Charles I. Charles II. it is stated, did something to improve the fire of the guns, but no attention was paid to the equipment or mobility. After the restoration the Company of Gunners at the Tower was increased to 100, the Master Gunners of England became more important personages, and a Surveyor General of the Ordnance, and Chief Fire master, were created. In 1672 the Laboratory at Woolwich was established, and in 1682 a great reorganisation of the Ordnance took place under the Master General, Lord Dartmouth. Abuses and incapables were got rid of, Artillery education was encouraged and discipline enforced. In 1686 we learn that at the Hounslow Camp "brass 3-pounders under Gentlemen of the Ordnance were escorted to their places by the grenadiers of the various regiments" this being a curious example of the tactical system of "battalion guns," a system which existed to a comparatively recent date.

The train of Artillery with which James II. prepared to meet the invasion of 1688 was a considerable one. Its detail will be found at p. 53., Duncan's History of the Royal Artillery, and we shall only notice that in it we find an Adjutant, and a Battery Master.

"Bombardiers" also make their appearance, and it appears that in those days also the Artillery undertook the transport of the small arm ammunition.

William, III. 1689 introduced foreign Artillery, and undertook the reorganization of the personnel. Companies were formed and in 1697, after the Peace of Ryswick, the first regimental establishment was formed, which however was soon again broken up. The establishment of this regiment was 1 Colonel, 1 Lieutenant Colonel, 1 Major, 1 Adjutant, 1 Comptroller, 4 Companies each of 1 Captain, 1 first Lieutenant, 1 second Lieutenant, 2 gentlemen of the Ordnance, 2 Sergeants, 30 Gunners. The Adjutant was the celebrated Albert Borgard, afterwards first Colonel of the Royal Artillery. It was in the seventeenth century that hand grenades, mortars and howitzers were introduced, the English and Dutch using them chiefly.

* The Gunner by Robert Norton one of his Majesty's Gunners and Engineers 1628.
The Gunner's Glasse by William Eldred, Master Gunner of Dover Castle, 1646.

Henry IV. of France occupied himself diligently in improving the French Artillery. His minister Sully was named Master-General of that arm, and this monarch was one of the first to recognise the coming importance of Artillery. During the last ten years of his reign (1600-1610) he may be said to have created an Artillery. More than 400 guns were turned out, including a large number of field pieces. The French tactics of those days were chiefly to select and fortify a strong position and there await attack. Offensive tactics were the fruit of modern times and it is curious to note how the matter lies in a circle, for after a brilliant history of offensive tactics superseding the old forms, we have seen a revulsion of feeling towards the old system of defensive tactics prior to the war of 1870-71.

In the reign of Louis XIV. the improvements seem to have been made chiefly in siege Artillery. Position Artillery was used and there appears to have been a disposition to regard batteries of this kind covered by embankments, or even when employed in field fortifications, as the natural rôle to be played by Artillery. Improvements however took place in the matériel. The calibres were reduced in number and made uniform and those adopted, viz., 33, 24, 18, 16, 12, 8, 6 and 4 pr remain unaltered up to the present day, some of them having been rifled.* Carriages were improved. "Siege and field carriages had heavy bracket trails, but were provided with limbers having a straight pintail on the top like our old service siege limber;"† platform wagons were used to transport guns; wrought iron field carriages and mortar carriages were used; and the carriage for coast batteries was little dissimilar to the standing gun carriage of the present day. Although the practical progress of Artillery was not great in France at this epoch, it cannot be denied that she was the first to give a permanent foundation to the new arm. Louis XIV. raised in 1671 a regiment of Royal Fusiliers as Artillerymen, composed of Gunners and workmen. Schools of instruction were established and the arm recognised as a special branch.

In other continental nations generally little appears to have been done to establish Artillery as an arm of the service. In Germany the Gunners were distributed in garrisons in independent Companies, and in 1688 the Brandenburg (Prussian) Artillery consisted of 300 men only. The history of matériel is distinguished by the invention of the elevating-screw said to have been first used at the siege of Brussels in 1650.

The Seventeenth century will however always be famous in the history of Artillery for the improvements effected at the hands of the great Swedish warrior, Gustavus Adolphus. He may be said to be the originator of the battalion system, but checked any evils attendant on great dispersion by keeping in hand a considerable reserve. The proportion of guns to men was raised by him to a large extent, being over 6 per 1000.

(To be continued.)

* Owen's Modern Artillery.

† Ibid.

IV.

MOUNTED INFANTRY.

This subject has received lately much attention, and the advocates for the creation of such an arm in the British service have always met with discouragement.

The arguments in favour of the arm are now stale, they are irrefutable ; but it is argued truly on the other side that our Cavalry is numerically deficient and if we cannot afford to strengthen our weak squadrons we should not divert money in favour of a hybrid, and perhaps not indispensable arm.

Hitherto however mounted Riflemen have been treated chiefly as horsemen and the possibility of conveying men rapidly and *cheaply* in wheeled carriages has hardly received the attention the scheme deserves from military writers.*

I venture to propose a four horsed waggon (with two drivers) to hold 12 riflemen, and the novelty I advance is chiefly in the construction of the waggon and its adaptation to a three-fold service. The details of weight, draught, &c. are not entered into at present, though, failing more experienced hands, I should be glad to elaborate them, should the rough project appear of value.

1st The construction of the waggon.

The waggon to consist of fore and hind axles, trees, arms and 4 wheels with turn table for fore wheels and springs if necessary. On this is laid a rectangular waggon frame easily removable from the axles.

Over this again comes the waggon body of two pieces and formed of rolled steel $\frac{3}{16}$ inches thick and impervious to rifle bullets ; the sides are each provided with 6 loopholes and with brackets holding a near and off plank to serve as seats.

On coming into action, it is only necessary to dismount the waggon body and lay the near and off sides of the waggon body on the ground, in prolongation of each other, and each waggon provides a bullet proof shield for the 12 men it has brought fresh into action, thus obviating the labour and time lost in excavating a shelter trench.

On retiring, the waggon frame, which has kept under cover during the action, again drives up, the men place the shield on the frame, jump up and the whole drives off. If hard pressed they would desert the

* Colonel Evelyn Wood has elaborated an organisation of mixed horsemen and men on Irish Cars. The "old Shikari" has propounded a system of a Cavalry car with a Gatling gun (another neglected arm) in tow at the tail of the car. The subject appears to have been mooted and dropped.

shield and jump on the waggon frame. The shield would then be lost as all material is liable to the chances of war.

2nd. The waggon body is provided with a bag of the same shape as itself, slightly larger so as to fit on easily, and constructed of water-proof cloth, (in fact the waterproof blanket of the American War.)

Covered with this the waggon body becomes a pontoon.

The waggon frame dismounted becomes the road bearers of the bridge and the seat planks become the roadway. If necessary each pair of wheels lashed together with stones between will form sufficient anchors or these may be carried and it is only necessary to add a few fathoms of rope to complete an excellent bridge capable of carrying Infantry in file and even Cavalry in file.*

The drill of a pontonier is most elementary and could be superadded to the education of a soldier of any arm without overtaxing his powers. Pontooning is only in the British service a speciality of the Engineers.

With all material found and a simple drill mastered, any men can form a bridge.

Without a prepared equipment the operation becomes complicated to the verge of science and requires much practice.

The Austrian cavalry pioneers in the war of 1866 showed what bridging could be done by comparatively untrained men.

The waterproof bag when supported on 4 bamboos is also used as a tilt or waggon cover to protect the men in motion from sun and rain.

At night the seat planks are removed and the men use the waggon as a tent to sleep in, thus saving themselves in every way and avoiding many a costly hospital case.

3rd. I have hitherto spoken of the dismounted waggon sides as shields in an infantry combat ; of course they would not resist the lightest artillery without earthwork in front and, in attacking artillery, the riflemen should, from the moment of coming under fire, advance as pure infantry leaving the waggons sheltered.

In a case of a cavalry attack on dismounted riflemen the shields might be shifted into square, or arranged chequer wise to break the

* I may call attention to the fact that a water-proof bulletproof box travelling on four wheels and carrying soldiers is an item of our present equipment, such is a correct description of the modern British Pontoon boat (Blood's). The only difference between it and my proposition is that it is 1st a pontoon ; 2nd a carriage for its crew. Mine is 1st a carriage, 2nd a pontoon.

The mode of using the waggon frame as a road bearer is also economical carriage.

charge or placed double in a square or redan, according to the ground, position of neighbouring troops &c.

There is yet another phase of combat in which I will conceive the jolly waggons to be engaged. The waggons mounted and filled with their freight of riflemen are threatened by a body of cavalry.

If exceeding twice their number it would be advisable for the company to form oval with their horses heads inwards and the men crouching in the waggons in double rank would then deliver their volleys in perfect security, as even should the cavalry actually reach the waggons they could not cut down the occupants, who, safely ensconced above the reach of sabres and even inconveniently placed for receiving lance thrusts, would be able to destroy their adversaries at the closest quarters.

Against anything like an equal force the waggons might advance not in line, but in echelon at double intervals and in a direction oblique to the advance of the cavalry whose flank or flanks the waggons would attempt to gain.

Moving at a trot the mounted riflemen would form in double rank in the waggons and fire obliquely to their front, using the wagon sides as rests for their rifles.

Arrived within 100 yards of the cavalry the waggons should be reversed and the last shots delivered. By reversing the weakest part of the system, the horses, would be spared the *shock* of the charge, and the riflemen should then be able to protect the horses, drivers, and traces from the onslaught of the melee. *They themselves could neither be ridden down or injured.*

Now as to units I have purposely avoided figures and confined myself to description but I will suppose a company of mounted riflemen in order to show the small proportion of horses required for this system of so many utilities. I have purposely omitted mounting N. C. O's. on horses. The units should be a company, no larger, and mounted markers should not be needed with a non-pivot drill, the officers can carry out all dressing.

- | | |
|-----------------------------------|---|
| 1. Coy.
Mounted Rifles | 1. Captain 2 horses.
3. Subalterns 3 "
1. Sergt. Major
8. Sergts. viz,
4. Sergt. of Sections.
1. Farrier Sergt.
8. { 1. Wheelwright "
1. Artificer "
1. Quartermaster Sergt.
6. Full Corporals. |
|-----------------------------------|---|

- 6. 2nd or Lance Corporals.
- 1. 2nd Corporal Rough Rider.
- 2. Buglers.
- 120. Privates.

Total 144. ALL RIFLEMEN.

All ranks					
178.	Drivers	30	<i>If possible</i>	$\frac{1}{2}$ available as riflemen.	
Horses in waggons		...	...	...	48
" Spare		...	...	...	12
" Officers		...	...	...	5
				Total	65

Waggons—12.

furnishing 72 yards bullet proof parapet and 36 yards or 108 feet of bridge, with Tent accommodation for all.

**Trench Carts or General Service Waggons 2
drawn by spare horses and containing**

Axes	...	...	"
Spades	...	...	"
Cordage	...	...	"
Anchors	...	...	"
Ammunition	...	...	"
Gun Cotton discs and fuzes			

Gun Cotton discs and fuzes for demolition.

The men should be of small stature, armed with short rifles and equipped as Infantry, their kits to lie beneath the seats or be worn on their backs.

The Officers and Drivers to be equipped as Cavalry.

Only one difference would I make in the dress and that I would venture to recommend for all Infantry. A bountiful nature has not created us flat footed but has granted us an arched and elastic instep with the free use of toe and heel.

Government supplies an inelastic sole made in one piece from toe to heel and cramping the movement of the foot.

I believe a manufacturer * has invented a strong supple jointed sole which would increase the cost of each pair of boots by 6d. I cannot too strongly urge the adoption of such a sole for infantry; let any one try the two in a long march, I have done it, and the difference is unmistakeable.

* Dowie, Strand, London.

The sandals of the Spanish Infantry, one of the best marching in the world, are immeasurably lighter, easier, and cheaper than our solid leather casing. Many improvements in Infantry booting have been made of late years in the British Service. I cannot think perfection is yet reached.

In conclusion I would repeat that sooner or later mounted Infantry must take their place. Cavalry cannot supply it.

As Marshal Marmont has said 50 years since, with reference to mounted Infantry which he advocates, you cannot train cavalry soldiers with two ideas. viz :—

1st. That their charge is irresistible by infantry.

2nd. That when dismounted, they can repulse cavalry with their rifles.

The foundation of all confidence is that each arm should believe in its own invincibility.

The value of mounted infantry lies in its mobility, which enables it to support cavalry and artillery in rapid advance.

There seems every probability that, other things being equal, success in future wars will hinge greatly on the first initiative made by an advance of cavalry en masse—*rightly supported*.

M. MARTIN.

The weight of the waggon body or pontoon (if $\frac{3}{16}$ inches thick of rolled steel) will be under	...	...	...	...	...	800 lbs.
Compare Austrian Iron Pontoon	...	...	...	...	...	860 lbs.
Belgian	...	...	...	...	...	11,045 lbs.
When the waggon is loaded with the riflemen, each of the 4 horses will have to pull, 834 lbs.						
This is rather more than horses in Horse Artillery Teams have to pull, but a horse can draw 1600 lbs. 23 miles in a day. (Average R. A. draught horse.)						
The flotation of the Pontoon will give an available buoyancy of 3500 lbs. i. e. 3500 lbs. on each bay will sink the pontoon to 6 inches from water line to gunwale.						

NOTICE.

UNITED SERVICE INSTITUTION OF INDIA.

An Exhibition of Military Drawings will be held at Simla during November 1877. All drawings intended for competition, to be exhibited by the 15th of October. The first prize will be of the value of Rupees 100—and the second prize of the value of Rupees 50.

All Officers in India whether members of the Institution or not are eligible to compete for the above prizes.

The Drawings to consist of Military Sketches of ground, executed by a matricular taught at the Garrison Instruction classes throughout India.

The first prize will not be awarded for a copy.

Two additional prizes of the value of 70 and 30 rupees respectively will be awarded for competition to all Non-Commissioned officers and privates of Artillery, Cavalry, and Infantry, doing duty with their regiments in India. The conditions the same as for the officers prizes.

The prizes will be awarded by a Committee of the Council.

Drawings for competition may be sent either framed or unframed.

By order of the Council,

H. H. STANSFIELD, LIEUT.-COL.,
Secretary United Service Institution of India.

SIMLA,

20th June 1877.

N O T I C E .

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1878.

Members can pay their subscription to the Alliance Bank, Simla if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton as they desire.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV and V to any member wishing for the same.

H. H. STANSFIELD, LIEUT.-COLONEL,
Secretary.

ORIGINAL PAPERS.

I.

NOTES ON THE HISTORY, MATERIEL, ORGANISATION AND TACTICS OF ARTILLERY,

BY

CAPTAIN E. H. H. COLLEN (*late R. A.*)

*Assistant Secretary, Government of India Milt. Dept. (continued
from No. 26.)*

18th Century.—This century was fruitful in Artillery progress. In England it saw the Royal Regiment of artillery permanently established, and on the continent rapid strides in every branch of the arm.

The Duke of Marlborough was appointed Master General of the Ordnance on the accession of Queen Anne in 1702, and in the same year war was declared with Germany and the States-General. The artillery train accompanying the army did not differ very essentially from those before described except that we trace the presence of Commissioned and Non-Commissioned Officers. The service of the train in the field appears to have been excellent. It was in 1703 that artillery-men were first put on board "bomb-vessels," and in 1704 the first detachment of Gunners was sent to Gibraltar. Mortars were used mounted upon travelling carriages at this period and in 1706, 46 guns and 60 mortars formed the artillery of a force of 11,000 men. This train was stocked with matériel of every kind. At this period too, small trains were organized for service abroad, and after the Peace of Utrecht it was found necessary to keep these up. These trains were for service in North Britain, Gibraltar, Port Mahon in Minorca and Nova Scotia. Although the Royal Artillery as a regiment did not take part in Marlborough's campaigns, many officers and men who were subsequently embodied served in the trains of artillery in these wars. At Blenheim it is said a strong battery posted on the allied right wing greatly assisted the victorious result by its enfilade fire, and at Malplaquet Marlborough deployed 40 guns to the centre of his position, so that though we have scanty record of the handling of the artillery, we may fairly infer the great General recognised its importance.

The failure of the Ordnance Board in the arrangements to be made for a train of artillery in Scotland in 1715 resulted in the regimental

establishment, and on the 26th May 1716 the artillery which had so long existed was formed into 2 companies of Royal Artillery. From this date commences the history of the Royal Regiment of Artillery. In 1727 the organisation was expanded into 4 complete companies, commanded by a Colonel, Lieutenant Colonel and a Major, the Colonel of the regiment was Albert Borgard. In 1740 two more companies were added. Albert Borgard was a Dane and a soldier of fortune he served first in the Danish Army, afterwards in the Prussian service and subsequently entered that of England. He died in 1751 at the age of 92, a brave and honest man, and an able artillery officer. The first train, ever manned by the Royal Artillery was in 1719, with Lord Cobham's force against Spain. It consisted of 10 officers, and "fireworkers," 7 non-commissioned officers, 20 gunners, 40 Matrosses &c., and the *materiel* of four 24 prs, four 9 prs, and six 1½ prs, on travelling carriages, in addition to mortars, &c. From 1722 to 1741 England was at peace and if we except the siege of Gibraltar by the Spaniards in 1727 in which 200 Royal Artillery took part, there is little to chronicle in the military history of the English Artillery. In this year the regiment was increased to 4 companies. The rank of Captain-Lieutenant had been introduced in 1720, the Lieutenants being called "Lieutenants and Fireworkers." Each company consisted of 5 officers and 4 fireworkers, 18 non-commissioned officers and bombardiers, 30 gunners, and cadet gunners, 48 matrosses and cadet matrosses and 2 drummers. In 1740 the artillery was increased by 1 company and the other companies augmented. In 1741 the Royal Military Academy was instituted for the instruction of the cadets in the regiment and officers and men of the artillery. The cadets were accommodated in buildings at the Warren, and it was not till 1806 that the new academy was opened at the foot of Shooters hill, unfortunately destroyed by fire in 1873.

In 1742 we find the regiment possessed 8 companies. At Fontenoy 1743 although the artillery did service, the delay which was caused by the necessity for dragging the guns by hand was a serious counter balancing disadvantage. In the Scotch rebellion of 1745 the artillery was used with effect at Carlisle and Culloden, and at the battle of Culloden greatly contributed to the victory, but at Falkeith its cumbersome character and want of mobility resulted in the loss of 7 guns.

In the continental wars of these times it is of interest to note the proportion of ammunition carried.* Each gun in the field had 100 round shot and 30 rounds of grape; stores and ammunition were issued direct by the commissaries to the Brigades of guns (batteries). In 1748 a company of Royal Artillery went to the East Indies and took part in the siege of Pondicherry and that company formed the nucleus of the Indian artilleries.

In 1756 we find that the artillery which went to the camp at Byfleet consisted of 24 prs, 12 prs, 6 prs, 3 prs and that it had

* Duncan's History of Royal Artillery.

ammunition wagons and carts, forge cart, triangle gyn, with a personnel of 29 officers, 61 non-commissioned officers, 57 gunners, 330 matrosses, 80 miners, 19 drummers and fifers. The guns were divided into "Brigades" (i.e., batteries) of 4, 5 and 6 guns respectively, and we learn that there were in those days flags borne by the artillery. Even in these times we find commanding officers anxious to drill artillery as infantry and paying more attention to this sort of instruction than to the more legitimate work.

In 1755 an augmentation of 4 companies took place for service in the East Indies. These companies were in the pay of the H. E. I. company, and took part in the expedition under Clive and Admiral Watson, being the last Royal Artillery which served actively in India until the mutiny of 1857.

In 1757 the regiment, which included sappers and miners, consisted of 24 companies. The separation which had always existed between the English and Irish Ordnance Departments (though nominally amalgamated in 1674) resulted in the formation of a distinct corps of artillery styled the Royal Irish Artillery, which gradually increased from a small nucleus of Royal Artillery to a strength of 20 companies in 1794. The Royal Irish Artillery was amalgamated to the Royal Artillery in 1801. At this epoch, too, guns began to be separated into Heavy and Light "Brigades," each field gun was horsed by 4 horses, there being 73 horses for a Heavy and 51 to a light "Brigade" or Battery and the two leading horses were ridden by artillerymen.

In 1757 the 24 companies were divided into 2 Battalions and at the end of the Seven Years War these had increased to 30 companies. Three companies of the Royal Artillery took part in the battle of Minden in 1759 and were handled tactically with great success, illustrating the advantages of a certain amount of independence of movement being given to the artillery and the commanding officer by his concentration of guns and fire, and non-adherence to the tactics of the Battalion guns. These tactics were simple enough. The two guns were under the command of a corporal, who was left pretty much to his own devices, the guns marched in rear, unlimbering, when within 500 yards of the enemy, and were pushed forward 50 paces in front of the battalion. The English Artillery even in these days won praise from foreign critics. Decker says* "the English Artillery was distinguished by its lightness, its elegance, and the good quality of its materials. In the battle of Marbourg (1760) although the English artillery was not horsed, it followed Lord Granby's Cavalry at a trot and was always ready to engage." "The English Artillery," says Tempelhof, "could not have been better served; it followed the enemy with such vivacity and maintained its fire so well, that it was impossible for the latter to re-form." A 3rd Battalion of Royal Artillery was raised in 1760, or about that year, and a 4th Battalion in 1771. In 1779 the Invalid Companies, the descendants of the old local garrison

* " Battles and principal combats of the Seven Years War."

gunners, were consolidated into a battalion. In 1779-80-81-82-83 in the great blockade and siege of Gibraltar the gallantry and devotion of the garrison artillery were conspicuous.

In the American war of Independence 1775-1783, the Royal Artillery played a considerable part. At the battle of Bunker's Hill, Artillery tactics partook of the vicious principle of absolute conformation to infantry movements to such a degree, partly induced by the want of mobility of the guns, that the troops advancing slowly were halted to give the artillery time to produce effect. At the battle of the White Plains, 1776, a concentration of 30 guns did good service, and at the battle of Stillwater the artillery covered the retreat admirably. The battle of Brandywine 1777, may be mentioned as an instance of the successful passage of a river under cover of the fire of artillery. About this time the foundation of the Royal Military Repository, the powder factory at Waltham Abbey, and the more efficient administration of the Royal Laboratory did much to place artillery matters on a better footing. In the many affairs and battles which took place towards the close of the American war the artillery bore its share both of disasters and successes. With the peace of 1782 a reduction of artillery took place.

"In the English Service, previous to the establishment of the battery system, all the artillery of an army was formed into a field train including field and siege guns; the former were nominally divided into brigades of 12 pieces, with a company of 100 gunners, but they were distributed for fighting among the infantry at the rate of two per battalion. The horses were purchased or hired, and entrusted to conductors temporarily employed. So late as 1799 there were only two 6-prs, with one ammunition wagon to a brigade of infantry; each piece was drawn by three horses in single draught and conducted by a driver on foot with a waggoneer's whip. Horse Artillery was, however, introduced in 1793, and 'driver corps' in 1794; but the battalion guns were retained until 1802, when field batteries of 6 guns each were established, but called *brigades*, the term *troop* being applied to horse artillery batteries".* The "driver corps," raised in 1794 consisted of a few subaltern officers, with non-commissioned officers, artificers, drivers and horses. The corps was divided into troops, the addition of one of which to a company of foot artillery converted it into a field 'brigade.' The horse artillery possessed both drivers and horses and only required very limited assistance from the driver corps.

We have mentioned that in India 1748 a company of Royal Artillery was sent to the East Indies and formed a nucleus of organisation for the Indian Artilleries. Long prior to this date, however, there had existed small establishments of gunners which sprang up with the old factory guards developing in the course of time into large and powerful armies. At each of the presidencies of Bengal, Madras and Bombay there existed a species of artillery chiefly recruited from the navy and

* Owen's Modern Artillery.

merchant service, called the "gunner's crew," but it was not until 1749 that a regular company of artillery was raised in each presidency. The officers of these companies were to perform the duties of Engineers as well as those connected with artillery, and they and the non-commissioned officers and gunners also did the work of the magazines and laboratory which is now embraced by the Ordnance Department. Bombay received an important addition to its artillery establishment in the shape of two companies of Royal Artillery sent out from England prior to 1754 and in 1756, three more companies arrived and were distributed among the presidencies.

In Madras a field-train was organized in 1756, and two years previously a detachment of artillery came out from England with the 39th Foot. In 1765 on the re-organization of the Bengal Army by Clive, the artillery consisted of 4 companies, and the Madras artillery of 3 companies with about the same strength in Bombay. The greater part of the Royal Artillery then serving in India, volunteered for and was incorporated in the Indian Army, thus forming the basis upon which were founded the three corps of Bengal, Madras and Bombay Artillery. A company of Royal Artillery appears to have been at Fort William in 1798, but from that date until the mutiny of 1857 no Royal Artillery served in India. Space does not permit us to trace the development of the Indian Artilleries at any length. The changes both in organisation and matériel followed those adopted in England though somewhat tardily. The valuable memoir of the Bengal Artillery commenced by the late Captain Buckle of that corps, and finished by Lieutenant J. W. Kaye, and the fuller work of Major Stubbs now in the press afford excellent materials for tracing the various changes in the history of the Bengal Artillery; Madras furnishes a very complete record of its artillery in the work of Captain Begbie, but we are not aware that Bombay has produced a similar interesting account of its portion of the Indian artillery. The history of the one however is typical. The early days were passed in difficulty and comparative obscurity. Recruited from the navy and the dregs of the population, officered by men drafted from other corps or from aspirants tired of the hard life of a midshipman, while conspicuous gallantry was frequently shown, there is no room for wonder at the ignorance which prevailed. Gradually, however, officers were obtained from the Academy at Woolwich and the Royal Artillery, more attention was paid to a study of the military profession and artillery science; natives were instructed in artillery service, and used as auxiliary to the European Artillery. The service of the magazines was improved and the laboratory work advanced in skill. The rude *materiel* was gradually exchanged, and experiments made towards providing the most suitable gun and carriage for Indian service. The history of the personnel is so far as regards organisation merely an account of successive changes chiefly due to increase of establishment. The history indeed of the wars and sieges in which the Indian artilleries were engaged would be a history of India itself. We may, however, touch briefly on the main points in the history of the Indian Artillery up to the end of the

18th century. The company of Bengal Artillery which had been raised in 1749 disappeared from the pages of history in the terrible massacre of the Black Hole, and it was not until 1758 that the first company of the Bengal Artillery of the late establishment was raised. In 1765 on the re-organization of the army by Lord Clive the artillery had been increased to 4 companies. The Ordnance with each company consisted of six light 6-prs and two howitzers, while each infantry battalion had in addition, two 6 prs or 3 prs worked by the infantry and lascars. In 1770 an increase of one company took place, the five being formed into a battalion, while the "lascars" or native assistant gunners and magazine men were divided into companies. The term 'lascar' * with many similar still clinging to the artillery service in India, was brought from the naval service which furnished the first elements of the Indian artillery. Although efforts had been made to improve the personnel, the *matériel* was in a very indifferent state. Colonel Pearse, formerly of the Royal Artillery, and who died Colonel commandant of the Bengal Artillery, did much to improve the latter as he had changed the condition of the former. At this time, about 1770, we learn that the "fuzees" burnt any how, that port fires, tubes and powder were alike infamous, the guns were indifferent, and the carriages worse, a contractor supplying the latter uncontrolled by the artillery. The guns were 6 prs, 3 prs, $5\frac{1}{2}$ inch howitzers, 12 prs were subsequently used. In 1770 Colonel Pearse introduced the English gun carriage and limber, replacing the weak and badly made bracket carriage.

In 1775 a Board of Ordnance was formed, and magazines established at certain military stations. This Board consisted of the Governor-General, the commander of the Forces, the members of the Supreme Council, the Commissary-General of Control, the Commandant of Artillery, the Chief Engineer, the Commissary of Stores and the Military Store-keeper. In 1778 a further increase of the artillery took place, and to the exertions of Colonel Pearse and the officers he trained is due the state of comparative efficiency which the artillery attained. The artillery was now formed into a brigade of one European and three native battalions, and the "lascars" were reduced or transferred to the Ordnance Department. About this time the "Golundaz" or native artillery was reduced, and a general opinion appears to have prevailed in the Court of Directors that it was unwise to entrust natives with artillery, an opinion which was unfortunately borne out by later events. In 1779 a train of 4000 draught bullocks was instituted for artillery service. In 1786 the two battalions were divided into three of five companies each and to each infantry battalion, two 6 prs with 9 European Gunners and 30 "lascars" were allotted. During the second Mysore War 1790-92 a large siege train was put in motion consisting of :

4	24	prs.
24	18	"
4	12	"

* From " lashkar" an army.

60	6 prs
3	8 inch howitzers.
4	5½ " pis.
6	5½ " and 4½ mortars.
1	8 inch mortar.
60	6 pr tumbrils.
206	Store "
9	Spare carriages.
225	Carts.

In 1796 the Indian Army was remodelled. The artillery was converted into a regiment of 3 battalions with 30 companies of lascars. Lord Cornwallis was strongly desirous of uniting the artillery of the three presidencies and of incorporating the Indian with the Royal Artillery, but the influence of the officers of the three corps was sufficient to prevent that union of the king's and company's artilleries, while the ministry at home was not sufficiently strong to undertake a wholesale re-organization, which it needed a great catastrophe half-a-century later to bring about. In 1798 the artillery was increased and a curious step taken of mixing Europeans and natives.

We have alluded to the Royal Artillery sent out to Madras, and to the regular company formed in 1749, but so far back as 1690 there was a company of European Artillery raised from the various independent Factory guards which had sprung up. The year 1749 may however be taken as the date from which the Indian Artillery commences its history. In 1765 the Madras Artillery consisted of 3 companies, which strength gradually increased until in 1786 we find it divided into 2 battalions with several "lascar" companies.

The Bombay Artillery dates from the same epoch as the other portions of the late Indian Artillery, but in this presidency also, gunners had been previously entertained in small numbers for the defence of the various factories and forts, though the strength of the artillery in 1670 consisted of 2 gunners only, the guns being served by infantry.

About 1750-54 the Bombay Artillery was considerably assisted in its earlier organization by 2 companies of Royal Artillery from England, and although that Presidency did not require the same extensive military development as those of Madras and Bengal, its artillery was gradually increased to a strength proportionate to the requirements of the day. We have touched before upon the *matériel* of the Indian service, but a few words are required before leaving the Indian Artillery of the 18th century. Up to the end of the century, bullocks were alone used for artillery draught, they were attached to the carriages by yokes and traces of raw hides, the latter were superseded towards the end of the century by draught chains. In the earlier wars the ammunition was carried on the head of lascars, but it was not long before tumbrils were introduced, though of a cumbrous and unwieldy pattern. Cartridges were still made of paper.

In 1793 a new pattern tumbril was introduced to carry 90 rounds of 12 pr or 150 of 6 pr ammunition well fitted for bullock draught. Ammunition wagons were introduced with limbers similar to that of the gun, and capable of carrying the gunners. The first *elevating screw* was horizontal and passed through a quoin which was forced in or out to depress or elevate the gun. This fell into disuse between 1780 and 1790 and was replaced by various improved patterns.

The first Ordnance used was the 6 pr, of about $4\frac{1}{4}$ cwt. 3 prs of $3\frac{3}{4}$ cwt. were also used, but a heavier 6 pr of 6 cwt. superseded them and continued in the service to the end of the century; 18 prs and brass and iron 12 prs were also employed in the wars of the latter part of this century.

The first siege carriages used were very cumbersome, but some improvements were effected in the preparation of the siege train for Seringapatam in 1792 and the pattern then adopted was continued for many years. The old carriage was a bracket carriage fastened to a low limber forming a fourwheel carriage. In the newer pattern the limber was lower; travelling trunnion holes were introduced and the weight divided better on the axles. Iron axles superseded wooden ones about the end of the century.

FRANCE.—At the commencement of the 18th century and the war of the Spanish succession the artillery had not made the progress effected in the infantry. In the latter arm pikes had disappeared, muskets with flint locks had replaced the old heavy arm of the musketeers and the bayonet was introduced. Although increase in the number of guns had taken place, the want of mobility detracted from the importance of the arm. The carriages and wagons were driven by wagoners on foot who were not anxious to expose themselves to an enemy's fire, and consequently the guns had to be dragged about on the field of battle by ropes, and were often stationary during an action. The ammunition consisted of a charge of powder equal to $\frac{2}{3}$ rds. the weight of the shot, and tin boxes or caissons holding nails, old iron, or lead balls; while sometimes lead tarred balls, arranged round an axis and kept together by a net, were employed, this species of ammunition receiving the name of *grape*. Hollow projectiles had made their appearance and mortars were attached to the train for the destruction of villages. The artillery was generally divided into three Brigades, the heavier guns being collected at the centre, and the lighter pieces disposed on the flanks.

In 1732 the experience of the wars which took place towards the end of the reign of Louis XIV, bore fruit. Lieutenant-General M. de Valière perceiving the evil which resulted from the confusion in the variety of calibres, and in the forms and dimensions of the guns, proposed to remedy this state of things. The adoption of his suggestions fixed the calibres at 24, 16, 12, 8 and 4 prs, the dimensions of each class

of gun were made uniform, field guns and carriages were lightened and the guns were separated into brigades. Mobility, however, was disregarded, and the carriages were not made of uniform patterns, the horses were harnessed in file, and no improvement was effected in teaming the horses.

In a few years the matériel was however further improved by the introduction of serge cartridges, the abolition of the ladle, the invention of shot with wood bottoms or *sabots* attached by the bands. Regimental guns 4 prs, were used in the proportion of one per battalion, and 8 inch howitzers were manufactured. The French Artillery remained in an indifferent state until the great reforms effected by General Gibeauval in 1765. This officer had been sent to Austria during the Seven Years War, and had held an artillery command under Prince Lichtenstein. He was an able officer and possessed great administrative powers. Struck with the improvements in artillery effected by Austria, on his return to France he strove to build up a complete system both of personnel and matériel, creating a distinct materiel for field, siege, garrison, and coast artillery. Possessed with the then advanced ideas that field artillery should be mobile, and that its object was to fire on the enemy's troops, to destroy entrenchments, walls, and other obstacles, he at once dismissed from the park pieces of greater calibre than 12 prs, selecting for field purposes the 12, 8 and 4 pr guns. Passing by the ideas previously held that guns could only be employed when protected by parapets he reduced the length which had been necessary for the service of guns in embrasures, and consequently the weight. He reduced the charge and the windage. Experiments were made and the proposals were the subject of great discussion. It is needless to remark that like many reforms of a later date, the adherents of the old system utterly denied that the changes would be an improvement, pointed to the glories achieved under the older system, and were so far triumphant that although the reforms of Gibeauval were inaugurated in 1765, they were abolished in 1772. In 1774 however, they were re-introduced and in 1776 this illustrious artillerist when he became first Inspector General of artillery was able to carry through the improvements and reforms which will ever cause his name to be celebrated. For many years artillery has been separated into regimental or battalion guns, artillery of position, garrison and siege artillery; the position guns being distributed in large batteries on the flanks or in front of a position, and the siege artillery collected in a park or train. The field artillery of the new system included 4 pounder regimental guns and for the park 8 and 12 pounders with 6 inch howitzers; the ammunition was improved by the introduction of "case" canisters of sheet iron holding cast iron balls and old grape and case being abolished.

The carriages were constructed on a uniform model strengthened with iron, the limber wheels heightened and the draught diminished. Iron axletrees were introduced, straight pintles on the top of the lim-

bers and pales took the place of shafts. Boxes on the carriage held part of the ammunition. Travelling trunnion pales were introduced. The horses were harnessed in pairs, instead of in file as formerly, and the prolong of rope was introduced to unite the trail of the gun and the limber in slow retiring movements. A new ammunition wagon carrying fixed ammunition was also invented. The service of the guns was improved by the introduction of cross headed elevating screws and tangent scales, the latter experiments exploding the old false idea with regard to the absolute flatness of the path of a projectile. The manner in which the teams were driven remained much the same but the bricole was introduced, a collar with rope and hook to which the gunners and foot soldiers harnessed themselves. For siege and garrison service Griebeauval adopted the 16 pounder and 12 pounder guns 8" howitzer, and 10" mortar the 12,10 and 8" power mortars being introduced in 1785.

Siege only differed from field carriages in having shafts in lieu of poles. Griebeauval introduced for garrison service a carriage with wheels in front and a truck in rear running upon a circular racer. The great step made was in a uniform construction being adopted for all materiel and the parts susceptible made interchangeable.

In 1765 the personnel of the French artillery was re-organized. The field artillery with an army was divided into regimental guns and corps of reserve artillery. This latter portion was subdivided into divisions of 8 guns of the same calibre. A company of artillery was also attached to each brigade of 4 battalions. The battery of division was thus made the tactical unit, with guns, munitions and gunners complete, the horses and drivers being added at a later date.

The French horse artillery dates from 1791. Horsemen and gunners were combined, each class learning the work of the other. Companies were attached to a battery of six guns, and in 1793 when the divisional organization was adopted artillery was attached in divisions in proportionate strength, and regimental guns were abandoned and entirely suppressed by Napoleon in 1796. The reforms of Griebeauval bore fruit in the wars of the republic. The tables of construction which had been drawn up secured a uniformity of manufacture, the reduction of the weight of the gun gave mobility to the field artillery and enabled the artillery to be used with the greatest effect in the new tactics which Napoleon employed with the raw levies with which he fought the veterans of other European powers. The batteries which had been reduced in the number of guns from 8 to 6, were horsed by contract, and as might be supposed the horses, the harness and the drivers or wagoners were often in the most deplorable condition. In 1800 this evil was remedied by the establishment of a *driver corps* of soldiers.*

* For the account of the artillery of France and Germany the acknowledgements of the writer are due to "Conférences Régimentaires," Maxwell's translation of Taubert, the Revue d'artillerie, and Revue Militaire de l'étranger.

PRUSSIA.—The State of the Prussian artillery in the early part of the century was not good. Financial pressure supported the official neglect of an arm as expensive as it was soon to be important. At the death of Frederick I, in 1740, there was only 1 battalion of field artillery of 6 companies, and 1 battalion of garrison artillery of 4 companies. Nor did Frederick the Great at first place much value upon its services. But the tendency towards mobility in artillery soon manifested itself, the weight of the guns was reduced, and Frederick after experience became convinced of the necessity for creating an efficient field artillery. In the Silesian Campaigns 1744-45 the field artillery consisted of 12 and 24 pounder guns, with howitzers of various calibres. The efforts to lighten the guns were not successful in establishing the principle of mobility, as no corresponding advance took place in the construction of carriages. The artillery gained nothing in mobility by lightening the large pieces, for they were unable to stand large charges and there was loss in power. The earlier campaigns of the Seven Years' War proved this, and after the Battle of Rossbach, between the Prussians and the allied French and Austrians Novr. 5th 1757, in which action the Prussian Artillery did much to contribute to Frederick's victory, a return was made to heavy guns and heavy charges. But this change was insufficient, for the gradual destruction of the veteran Prussian infantry, and the excellent and well-handled Austrian Artillery, both needed to be counter-balanced by greater mobility and efficiency on the side of the Prussian Artillery. The first Horse Artillery was formed by Frederick in 1759, consisting of a battery of ten light 6 prs. A heavy 12 pr, weighing about 26 cwt. was also introduced into the field artillery, and the end of the Seven Years War showed that Prussia had endeavoured to bring heavy artillery into the field while the other European Powers had been bent upon lightening field guns. But the Seven Years War showed the Prussian monarch the power of the arm. The battle of Leuthen 1757, was "a day of honour for the Prussian Artillery," and although the Prussian light artillery was for long in an indifferent state, Frederick gave it a great impetus towards the admirable efficiency which it has subsequently reached. Frederick may be said to have created the Prussian field artillery by the adoption of a great number of light pieces, and especially howitzers. He formed the heavier guns into parks for the attack of fortresses, for the armament of important posts, and for the defence of positions, thus recognising the necessity of the distinction between field artillery capable of rapid manœuvre, and "guns of position." But up to the peace of Hubertsburgh 1763 the Prussian artillery was so far inefficient that it did not possess the mobility which that of other powers had attained. Consequently the field artillery was recast, and three kinds of 12 prs. were introduced with a heavy 6 pr, these calibres being retained until the end of the century. Frederick placed great value on howitzers, and made much use of them against entrenched positions, and at the close of the war, after experiments on a large scale had been made, the king ordered 40 heavy howitzers to be attached to each army corps. The horse artillery brigade or battery established in 1759 was twice destroy-

ed but reorganised a third time in 1760 and then consisted of six 6 pr guns and two 7 pr howitzers, forming what is known as a "mixed battery." At the termination of the three Silesian campaigns the Prussian Artillery had been increased to 3 regiments of foot artillery of 10 companies each and 2 horse artillery regiments, a fourth regiment of foot artillery was added in 1772. In the campaigns of 1778 the horse artillery batteries had increased to seven, and at the beginning of the 19th century to as many as twenty. In 1786 the 4 foot artillery regiments consisted of 9 battalions or 45 companies, 10 garrison or fortress batteries, and 3 horse artillery batteries.

The increasing importance of artillery may be shown in the fact that in the first Silesian wars the proportion of guns to men was between $2\frac{1}{2}$ and 3 per 1000, while at the end of the Seven Years War the rates had increased to 5 and 6 per 1000. In 1780 Frederick the Great had 972 guns or $5\frac{1}{2}$ per 1000. Notwithstanding the many defects which characterised the Prussian Artillery of this epoch, the wars of Frederick brought forward three great tactical principles in the employment of artillery.

1st. That smaller batteries of guns might be established at important points in the line of battle in lieu of the old formations at the centre and flanks.

2nd. To engage in battle and protect the deployment of columns, by light guns.

3rd. To change the position of batteries according to the course of the action.

AUSTRIA AND RUSSIA.—The Seven Years War brought forth fruit in other countries besides Prussia. The Austrian Artillery was re-organised by Prince Lichtenstein, appointed chief of the artillery. The Russian Artillery was also brought into a comparatively high state of efficiency. The Russian military authorities thoroughly acknowledged the importance of the arm and employed large numbers of guns, while each Dragoon regiment had 3 licornes or howitzers attached, which equipment with mounted gunners formed a species of horse artillery.

From the experience of the Seven Years War, were derived three important steps in the organisation of field artillery :—

- (1). The separation of position guns into batteries of 5, 8, or 10 pieces.
- (2). The union of howitzers in separate batteries.
- (3). The formation of light or horse artillery.

The Austrians employed their artillery with great effect during this century. They distributed the guns in "reserves," for the centre and each wing, and the fourth as a *grand reserve*. While their tactical



On the evening of his arrival Baird received intelligence of the victory gained on the 21st March by Sir Ralph Abercromby over the French troops under General Menon.

On the 24th, General Baird was on the point of sailing from Jeddah when Sir Home Popham arrived in H. M. S. *Romney* 50 guns, with the sloop *Victor* in company, closely followed by the division he was escorting from the Cape. This consisted of H. M's. 61st Regiment, commanded by Lieutenant Colonel Carruthers; several troops of the 8th Light Dragoons, Captain Hawkers, and a detachment Royal Artillery, Captain Beaver; Sir Home Popham brought however no intelligence regarding Colonels Wellesley and Champagné. Nothing had been heard at Mocha either of them or of the provision ships that were to precede or accompany them when Sir Home Popham touched at that place.

On the 26th May Baird sailed from Jeddah with Sir Home Popham in the *Romney*, and reached Kosseir on the 6th June. He found there Colonel Murray, and the troops that had accompanied them.

The force then under his orders was composed as follows :—

Royal	Artillery	...	Captain Beaver.
Bengal Horse	Do.	...	Captain Browne.
Bengal Foot	Do.	...	Captain Fleming.
Madras Do.	Do.	...	Major Bell.
Bombay Do.	Do.	...	Captain Powell.

Royal Engineers, Bengal	do.	Madras	do.	Bombay	do.
Madras Pioneers.					

H. M's. 8th Light Dragoons	...	Captain Hawkers.
" 10th Foot	...	Lieutt. Colonel Quarrel.
" 61st Foot	...	Lieutt. Colonel Carruthers.
" 80th Foot	...	Colonel Ramsay.
" 86th Foot	...	Lieutt. Colonel Lloyd.
" 88th Foot	...	Colonel Beresford.
Bengal Volunteer N. I.	...	Captain Michie.
1st Bombay Regt. N. I.	...	Major Holmes.
7th ditto ditto	...	Major Laureston.

The respective quota furnished by the different establishments to which these corps belonged, is thus to be divided :

East India Company's Artillery	Men.
Ditto Native Troops	... 448
H. M's. Troops	... 1940
	... 2438
<hr/>	
Total	... 4826

To this must be added,

European officers	... 218
Native ditto	... 53
Drummers	... 125
Lascars	... 440
Servants, not soldiers	... 276
Public followers	... 572
Private ditto	... 305
 Grand Total	... 6815

This force was commanded in chief by Major General David Baird, 54th Foot, who had as his Adjutant General, Colonel Achmuty 10th Foot, and as Quarter Master General, Colonel Murray 84th Foot. It was divided into two brigades, the Right and the Left, the former commanded by Colonel Beresford, the latter by Lieutenant Colonel Montresor.

General Baird's first act, after arriving at Kossier, was to place himself in communication with General Hely Hutchinson, commanding the British Army of Egypt after the death of Sir Ralph Abercromby. But his letter had been sent off only five days, when he received a despatch from General Hutchinsou himself dated the 13th May, from Rahamenie on the Nile.

In this letter General Hutchinson stated that it was his intention to push on towards Cairo so as to prevent the French from attacking the Indian force before it should have effected its junction with the Grand Vizier ; that he had written to that high officer to give General Baird all the assistance he might require for the passage of the desert.

After alluding generally to the difficulties to be encountered from the climate and the people General Hutchinson added that he intended to continue in his position near Cairo until he should hear that the Indian force was in a state of security ; that he would then descend the Nile and besiege Alexandria ; that he rather opined that General Baird should join the army of the Grand Vizier and besiege Cairo with him, for which purpose he would endeavour to procure for him some heavy artillery as none could be brought across the desert.

To this letter General Baird replied that the Admiral on the station (Admiral Blankett) had pronounced the journey by sea to Suez at that season of the year to be impossible ; and that he was about to send off his Quarter Master General, Colonel Murray, to Keneh, where he would either remain, or proceed down the Nile to open a communication with General Hutchinson.

General Baird, in anticipation of a forward movement had already established military posts for nearly half the distance between Kossier and Keneh, and had directed the men forming them to dig for

water. At all these posts water had been found. The General determined therefore to push on a corps at once in advance, to be followed by others. The first of these corps commanded by Colonel Beresford left Kossier, therefore, on the 19th June.

The route they had to take may thus be concisely shewn :*

Kossier to the New Wells	... 11 miles, Water.
Half way to Moilah	... 17 " No water.
To Moilah	... 17 " Water & provisions.
Advanced Wells	... 9 " Water.
Half way to Segeta	... 19 " No water.
To Segeta	... 19 " Water & provisions
To Baromba	... 18 " Water.
To Keneh, on the Nile	... 10 " The Nile
<hr/>	
Total	... 120

The march was encumbered with difficulties. The very first day many of the water bags leaked so much that all the water had escaped before the troops reached their destination ; the wells which had been dug there yielded indeed water, but it was procurable only in very small quantities. The dreariness of the country ; the depressing nature of the climate ; the burning sand and the burning sun ; all these added to the difficulties of the General, and called for the exercise of all his firmness, his presence of mind, and his fortitude.

General Baird had accompanied the two first detachments a part of the way. He then returned to Kossier to arrange measures for providing a water supply for the troops forming them. He had previously succeeded in obtaining about 5000 cairnels, and these he loaded with leathern bags or *mushaks*. In an order which he issued on the occasion will be found the means he had ascertained to be most efficacious for supplying the troops on the line of march with this necessary article.

After examining the various modes which had been suggested for ensuring a regular water-supply he announced the conclusion at which he had arrived that the army " must either trust to the puckallies, or find water in the desert, or re-embark."

The order then proceeded as follows : " Today's march of the 88th will decide the first point, and if it is possible to carry water, it should be done in this way.

" The 88th should take their bags on to Segeta, and after the next day's march thence, send them back to Segeta for the next corps.

* This itinerary is taken from the official orders signed by Colonel Montresor and compiled after General Baird had himself made the journey between the two places. The list given in the Memoirs of Sir David Baird was written before the journey had been attempted and is incomplete and imperfect, *Vide Asiatic Annual Register* for 1802.

" The 10th should take their bags to Moilah, and after the next day's march send their bags back to Moilah for the next division. The Artillery, increased to a hundred puckallie camels, should take their bags one day's march to the wells, and send them back. By these three divisions of bags the whole army could, in succession, be supplied. Careful steady men should be appointed to each division, and the principle should be well explained to every body. A European officer should also go with each division of puckallies.

" If the puckallies will not answer and the 88th get on to Moilah, a company should be sent to clear the wells, seven miles from Moilah, and two companies should be sent half way from that towards Segeta to dig wells, and, as fast as they find water, more companies should follow.

" In the same manner the 10th should send two companies half way to Moilah and endeavour to dig wells.

" If water is found at these stations, the 88th must halt at Segeta, and send on two companies to dig wells between that and Keneh.

" The Sepoys at the stations may go and assist and the two companies at Segeta should immediately begin between that and Keneh."

General Baird had decided to leave Kossier for Keneh on the 27th June. On that day however he received despatches from Bombay informing him that Colonel Champagne's detachment would sail in six transports "in a few days," and that Colonel Wellesley was prevented by ill health from joining him.

A feeling of soreness had existed between General Baird and Colonel Wellesley since the date (5th May 1799) on which the former had considered himself superseded by the latter in the command of Seringapatam. It is interesting therefore to read the manner in which an ill-feeling on the part of Colonel Wellesley had been effaced by personal contact with General Baird in Bombay.

" As I am writing on the subject," wrote Colonel Wellesley in a private letter dated Bombay, 9th April, " I will freely acknowledge that my regret at being prevented from accompanying you has been greatly increased by the kind, candid, and handsome manner in which you have behaved towards me; and I will confess as freely, not only that I did not expect such treatment, but that my wishes before you arrived regarding going upon such an expedition, were directly the reverse of what they are at this moment. I need not enter farther into this subject than to entreat that you will not attribute my stay to any other motive than that to which I have above assigned it;" (the state of his health) " and to inform you that, as I know what has been said and expected by the world in general I propose, as well as for my own credit as for yours, to make known to my friends and to yours, not only

the distinguished manner in which you have behaved towards me, but the causes which have prevented my demonstrating my gratitude, by giving you every assistance in the arduous service which you have to conduct."

Colonel Wellesley accompanied his letter by a memorandum in which he detailed the course he would recommend the General, in command of the force invading Egypt from India, to adopt.

Dismissing as impracticable any attempt to gain Suez in sailing ships at that season of the year Colonel Wellesley indicated Kossier as the place of which the army should first gain possession.

After referring to the probable movements of the French troops and the disposition of the Mamelukes and the Beys, the memorandum thus proceeded.

"The first question which I shall consider, and which will lay the grounds for a consideration of, and decision upon others, is, whether it would be practicable or even desirable to cross the desert from Kossier at all, if that operation is not performed in concert and co-operation with a body of natives posted upon the Nile.

"It is needless to enter into a statement of the difficulties to be apprehended in crossing the desert; they are certainly great, but I imagine not insurmountable. But, if it is not certain that the army or detachment which will cross the desert, will partake of the plenty of the banks of the Nile when they reach them; if they should be certain of having water only, and such forage as their cattle should be able to pick up, I apprehend that the difficulty will become so great that the operation ought not to be attempted. It is impossible that the Mamelukes in Upper Egypt can be neutral in the contest in contemplation: they must take part with the French or with us. If they take part with the French, the army will be in the situation in which I have above described it, enjoying no advantage from having reached the banks of the Nile, excepting water, and probably some forage; and it is needless to point out, that if the desert is to be crossed under those circumstances care must be taken not only to send with the body of troops which will cross a very large proportion of provisions, but means must be adopted to add to them until the operations of this body shall have given them such a hold of the country as to leave no doubt of their steady supply of provisions. It is obvious that this will require a great number of cattle, a number much larger than the Government of India, with all the zealous exercise of their power and means, can supply; but there is another consideration connected with this subject besides the supply of cattle, and that is the means of feeding them when landed from the ships.

"Upon this point I need only call to the General's recollection the difficulties to which he has been a witness in moving large supplies of stores and provisions even in fertile, cultivated, and inhabited count-

ries, well supplied with water, and under every disadvantage of arrangement in the supply, in the distribution, and the food of the cattle, and draw a comparison between such difficulties and those to be expected in a march through a desert. But that is not the worst that is to be apprehended ; the cattle will of course land in a weak condition, in a desert, and it must be expected that even those which survive the voyage will starve or at least be in such a state before they commence their march as to render it very probable that they will not carry their loads to the end of it. Upon the whole, then, I am decidedly of opinion, that if the Mamelukes are not on our side, no attempt ought to be made to cross the desert.

“ This opinion the General will observe is by no means founded on the impracticability of crossing with troops because I am convinced that it can be done ; but it is founded upon the danger that the troops will starve if they do not return immediately, and upon the inutility of the measure if they do.

“ It may be imagined that (supposing the Mamelukes to be wavering) if an attempt is not made to cross the desert, the advantage of their co-operation will be lost. Upon this point I observe, that a knowledge of our strength (not of our weakness) will induce them to come forward, and it might be expected that the right of our weakness, occasioned by our march over the desert without concert with them, might induce them to take advantage of it, and to join the French.

“ But those who will urge this consideration must suppose it possible that the Mamelukes can be neutral for a moment ; and this, their history from the beginning of time, particularly since the French invasion, will shew to be impossible.

“ I come now to consider the propriety and mode of crossing the desert, supposing that the Mamelukes should be inclined to shake off the French yoke and to co-operate with us. The first point for the General to ascertain is, their sincerity in the cause, of which, as I have above stated, there is every probability. As soon as he will have ascertained this, it will be necessary that he should make arrangements with them for posting a supply of water on that part of the desert where it is most wanted, and for having a supply of provisions ready on the Nile ; and he might cross over a part of his army immediately. The first object on his arrival on the Nile should be to establish a post at Keneh, and, if possible, another in the desert between that place and Kosseir, in order to insure his communications between the Sea and the Nile. At Keneh, he should make the dépôt of his stores &c., which might be brought across the desert by degrees, and then he might commence his operations against the enemy.

“ In the consideration of the question regarding the crossing of the desert I have omitted to mention the interruption which may be given to that operation by the enemy, because it is entirely distinct from the

difficulties which are peculiar to the operation itself. It is obvious, however, that if the Mamelukes are not on our side, and if they should not have driven out of Upper Egypt the small French force supposed to be in that country before the operation is attempted, that force, however small, will greatly increase the distress of the British troops who will cross the desert. I have not adverted to the supply of arms and ammunition to be given to the Natives. As long as their co-operation is doubtful, these supplies ought to be withheld but promised ; when they will have shewn their sincerity in our cause, the arms may be given to almost any extent."

On the third day after the receipt of this memorandum, viz.; the 30th June, General Baird quitted Kosseir. He had calculated that it would take him ten days to concentrate all his force at Keneh. Thence, should he be able to collect a sufficient number of boats, it might be possible for him to reach Cairo in twenty days. On the other hand, the land march from Keneh to Cairo would take, he believed, thirty-five days.

The difficulties of the march, owing to the want of water, the heat and the trying character of the soil, and the obstacles in the way of communication were so great that General Baird, lion-hearted as he was, despaired whilst waiting at Keneh for orders, of being able to effect anything useful to the public service. For many days he was without intelligence of, and received no orders from, General Hutchinson. Under these circumstances and dreading lest the breaking out of the monsoon might interfere with his return to India, he, on the 9th July, addressed from Keneh to H. R. H. the Duke of York, a letter expressive of his anxiety to know whether his continuance in Egypt was likely to be productive of any beneficial results to the service.

Just at this moment intelligence reached General Baird by a circuitous route that General Belliard, the French Governor of Cairo, had entered into a treaty with General Hutchinson. This information convinced General Baird that there could be no longer any necessity for his further advance, still less for bringing up more troops. Penetrated by this idea, he directed preparations to be made for the return of the force then at Keneh to Kosseir, and for its embarkation at the latter place.

But a few days later these views were destined to be altered. About the 22nd of July General Baird received from General Hutchinson a letter, dated the 10th Idem, in which that officer, after alluding to the want of information under which he had been labouring as to the strength and destination of the Indian force, stated that the French Commander-in-Chief, General Menon, had refused to receive the officer sent by General Belliard to lay before him the capitulation of Cairo, and that it was probable he would defend himself with great obstinacy and give a great deal of trouble ; that he should be extremely glad, therefore, to have General Baird's assistance and co-operation.

As to the mode of his advance and the means he should employ to effect it, General Hutchinson thus expressed himself : " I am thoroughly aware that from the season, and from the inundation, the march by land will be impracticable. You must do all you can to collect boats, but whether you should use force or not is entirely out of the question, because, for the last thousand years force has been the only law in this country, and the inhabitants are so little used to think for themselves that they are at a great loss how to act when it is not adopted against them."

He added, " I wish you to advance as soon as you conveniently can without pressing or fatiguing your troops ; you may march by detachments, and let them be ever so small there can be no difficulty in making your rendezvous at Gizeh which I have occupied entirely for your convenience. You have only to intimate your wishes to Colonel Stewart" (Commandant of Gizeh) " and every thing will be procured for you that the country affords."

With respect to his own movements General Hutchinson stated that his army had marched on the 9th and would arrive at Rosetta about the 29th. Thence he intended to proceed without loss of time to besiege Alexandria.

On receiving this letter General Baird lost no time in ordering all the troops up from Kosseir. Amongst those who responded to his call were four companies of the 61st Regiment, two of the 80th, the Horse Artillery from Bengal and the Artillery and Pioneers from Madras,—recently arrived at Kosseir. I may mention that Colonel Champagné and the provision ships had not even then arrived ; and that the *Susannah*, the ship in which Colonel Arthur Wellesley was to have sailed, was lost on her passage ! Never certainly was an attack of fever more opportune than that which prevented the future conqueror of Napoleon from taking part in this expedition !

On the 24th July General Baird despatched Colonel Quarrill with the 10th Regiment to Girgeh with instructions to enquire, on his arrival there, into the state of the roads and of the inundations ; he was further directed, that if he should find he could with safety proceed to Siout or to any town capable of furnishing adequate supplies for his troops, to march thither, and thence proceed in a similar manner as rapidly as he could towards Cairo, taking care never to expose himself to the chance of being overtaken by the flooding of the Nile at any considerable distance from a large town.

Colonel Quarrill was farther instructed, if he should find the roads impassable, to select some high ground, and wait the arrival of the river fleet with the General.

Having sent off Colonel Quarrill, General Baird proceeded to impress or otherwise procure boats. This was an easy task, and it was soon ascertained that the supply would exceed the demand. These boats

ed but reorganised a third time in 1760 and then consisted of six 6 pr guns and two 7 pr howitzers, forming what is known as a "mixed battery." At the termination of the three Silesian campaigns the Prussian Artillery had been increased to 3 regiments of foot artillery of 10 companies each and 2 horse artillery regiments, a fourth regiment of foot artillery was added in 1772. In the campaigns of 1778 the horse artillery batteries had increased to seven, and at the beginn the 19th century to as many as twenty. In 1786 the 4 foot art regiments consisted of 9 battalions or 45 companies, 10 garrison fortress batteries, and 3 horse artillery batteries.

The increasing importance of artillery may be shown in the fact in the first Silesian wars the proportion of guns to men was between 2 3 per 1000, while at the end of the Seven Years War the rates had increased to 5 and 6 per 1000. In 1750 Frederick the Great had 972 guns or 1 1/2 per 1000. Notwithstanding the many defects which characterised the Prussian Artillery of this epoch, the wars of Frederick brought forward great tactical principles in the employment of artillery.

1st. That smaller batteries of guns might be established at intervals points in the line of battle in lieu of the old formations a centre and flanks.

2nd. To engage in battle and protect the deployment of columns by light guns.

3rd. To change the position of batteries according to the course of the action.

AUSTRIA AND RUSSIA—The Seven Years War brought forth other countries besides Prussia. The Austrian Artillery was re-organized by Prince Liechtenstein, appointed chief of the artillery. The Russian Artillery was also brought into a comparatively high state of efficiency. The Russian military authorities thoroughly acknowledged the importance of the gun and employed large numbers of guns, while their regiments had 3 horses or howitzers attached, which in concert with mounted gunners formed a species of horse artillery.

From the experience of the Seven Years War were derived important steps in the organisation of field artillery:

1. The separation of position guns into batteries of 3, 6, & 12 pieces.

2. The manning of howitzers in separate batteries.

3. The formation of light or horse artillery.

The Russians armed their artillery with great effect during war. They manouvered the guns in "reserves" for the centre and wings and the centre as a grand reserve. While their

Part

R3

arrangements were not always in advance of their great opponent, the general excellence of their artillery was pre-eminent and afforded a model to other nations.

At the commencement of our wars on the continent in 1793, the British artillery was in anything but an efficient condition. The guns were dispersed among the infantry, they were horsed in single train, the ammunition was packed in rough deal boxes, the ammunition wagons were cumbrous and ill constructed, the drivers were mere carters on foot with long whips and the whole equipment was scarcely able to break from a foot's pace. Prior to the Peninsular war, however, the exertions of an able officer, Major Spearman, had done much to bring about an improved state of things. Horse artillery had been introduced in 1793 and driver corps established in 1794. The battalion or regimental guns were abolished in 1802 and field batteries or " brigades" of six guns were formed, horse artillery batteries being styled " troops". Military drivers were introduced, the horses teamed in pairs, the drivers being mounted on the off horses while 8 gunners were carried on the limbers and wagons. The equipment was lightened and simplified, the ammunition was properly packed and a correct system of manœuvres was introduced. The invention of shrapnel shell by Major Shrapnel in 1803 and the transformation of the rocket from a mere signal to a destructive engine by Sir W. Congreve in 1806 also added to artillery power. The composition of a troop of horse artillery from 1805 to 1807 was about as follows:

	Officers	Men.					Animals	Carriages.
		N. C. O.	Grs.	Drs.	Artifi- cers			
Horse Artillery	5	14	85	60	0		horses 164	19
Driver Corps	0	1	0	20	3		mules 36	0

The composition of a field " brigade" between 1808 and 1816 was as follows.—

	Officers	Men.					Animals	Carriages.
		N. C. O.	Grs.	Drs.	Artifi- cers			
Horse Artillery	5	17	123	0	0		horses 160	19
Driver Corps	9	0	96	10			mules 10	0

The troops of horse artillery were armed with five guns (6 or 9 pounders) and one 5½" howitzer. The field brigades were likewise armed with five guns and one howitzer the guns ranging from light 6 pounders to 12 pounders. At Waterloo there were 4 different armaments for field brigades. The Carrier Corps raised in 1794 consisted of a few subaltern officers with non-commissioned officers, artificers, drivers and horses. The corps was divided into troops, the addition of one of which to a company of foot artillery converted it into a field "brigade." The horse artillery possessed both drivers and horses and required very limited assistance from the driver corps.

The detachment of the Driver Corps was separated from the artillery in discipline and the officer (a lieutenant) ranked after the R. A. Officers. The troops of H. A. were armed with 5 guns and one 5½ inch howitzer, and in 1807 a complicated arrangement existed by which two guns were 9 prs. or heavy 6 prs. and 3 were light 6 prs., the experience of war however obliged the discontinuance of this mixed armament, and the simpler plan was adopted of having the 5 guns in the same battery of one nature.

At Waterloo there were four different armaments for field "brigades":—

Five 12 prs and one 5½ inch howitzer (heavy).			
" 9 "	Do.	Do.	
" 6 (heavy)	Do.	Do.	
" 6 (light)	Do.	Do.	(light).

Captair Heine gives an interesting summary of the employment of artillery in the Peninsular War in No 5, Vol. VIII, Progs. R. A. Instn. 1873. At the combat of Roriça Geary's battery moved at a trot and even at a gallop, an unheard of pace for artillery in these days. In the first campaign in Portugal Sir Arthur Wellesley was greatly hampered by the bad horses and want of mobility of the batteries, and we are told by Sir A. Fraser that few instances occurred in which the men were mounted on the carriages. Numberless examples afford proof of the great evil in the want of mobility of the field artillery. By the end of the war matters had somewhat improved and although the wagon system was as regards mobility inefficient, the French Officers were loud in their praise of the English Artillery both in personnel and materiel.

In 1815 the Royal Artillery numbered 23,085 of all ranks, but after the peace it was reduced and in 1819 consisted of 6,881 of all ranks.

The organisation was also placed upon a reduced scale, troops of horse artillery and field batteries being maintained on a skeleton strength of 2 guns each. In 1822 the Driver Corps was abolished and the men and horses distributed among the 9 field battalions, the men being enlisted as *gunners and drivers*. This system, although it obtained for some years, did not conduce to efficiency and for the very obvious

reason that it is difficult to find a sufficient number of men who can possibly combine dissimilar duties, the nature of which requires a difference in physique, in training, and in aptitude. In 1827 field "brigades" were styled field "batteries."

During the Peninsula War field guns and wagons appear to have been drawn by 6 and 4 horses respectively, but in 1820 a committee proposed that a heavy field gun should have 8, and a light field gun 6 horses and the latter number also be given to all other carriages. The Duke of Wellington however objected to these numbers as excessive. It was shewn, however in 1826 in Portugal that this was not the case, and His Grace was at last obliged to sanction the adoption of the proposed numbers on this service. For some years the artillery in common with the other branches of the British Army, was kept down to the lowest state, and we find Sir Robert Gardiner affirming that "it is a delusion to say England has a field artillery," and that if a sudden necessity arose only 14 guns fully equipped, could be sent on service.

In 1848 all the troops of horse artillery were increased to 4 pieces, and in 1852, with the field batteries, to 6 guns, the field and horse batteries being increased to 20 batteries, giving a total of 120 guns. Shortly before the Crimean War there was an increase of several battalions, but notwithstanding these various augmentations the field artillery during that campaign did not equal 2 guns per 1000 men, while the Siege Train never had more than two reliefs during a bombardment. The armament of field artillery had altered since the days of the Peninsula. The heavy and light howitzer had been superseded by General Millars 24 and 12 pr. howitzers; the 32 pr. howitzers had been introduced to accompany the 12 pr. gun; the heavy 6 and 3 pr. guns the 1 pr. mountain gun had been withdrawn in 1847; the field batteries were now composed of 4 guns and 2 howitzers (1852); and in 1847 the rocket troops had been abolished, and in 1854 rocket "sections," attached to horse and field artillery batteries.

In the Crimean war the field artillery consisted of Position batteries of three 18 prs. and one 8 in. howitzer and of four 12 prs. with two 32 pr. howitzers, of field batteries having 9 prs. and 24 pr. howitzers, and of horse artillery troops of 6 pr. guns and 12 pr. howitzers. The position battery of 18 prs. was horsed by 12 horses harnessed four abreast, the drivers riding on the near and off horses. In 1858 the experience of the Crimean war being conclusive with regard to the *gunner* and *driver* system, drivers were permanently attached to each field battery. Up to 1859 the Royal Regiment of artillery had increased to 15 battalions of field garrison artillery and 1 brigade of horse artillery, and the pernicious system prevailed of converting garrison companies into field batteries, and vice versa.

The head quarters of the horse brigade and of the battalions always remained at Woolwich, the troops or companies proceeding to out

In 1793 a new pattern tumbril was introduced to carry 90 rounds of 12 pr or 150 of 6 pr ammunition well fitted for bullock draught. Ammunition wagons were introduced with limbers similar to that of the gun, and capable of carrying the gunners. The first *elevating screw* was horizontal and passed through a quoin which was forced in or out to depress or elevate the gun. This fell into disuse between 1780 and 1790 and was replaced by various improved patterns.

The first Ordnance used was the 6 pr, of about $4\frac{1}{2}$ cwt. 3 prs of $3\frac{3}{4}$ cwt. were also used, but a heavier 6 pr of 6 cwt. superseded them and continued in the service to the end of the century; 18 prs and brass and iron 12 prs were also employed in the wars of the latter part of this century.

The first siege carriages used were very cumbersome, but some improvements were effected in the preparation of the siege train for Seringapatam in 1792 and the pattern then adopted was continued for many years. The old carriage was a bracket carriage fastened to a low limber forming a fourwheel carriage. In the newer pattern the limber was lower; travelling trunnion holes were introduced and the weight divided better on the axles. Iron axles superseded wooden ones about the end of the century.

FRANCE.—At the commencement of the 18th century and the war of the Spanish succession the artillery had not made the progress effected in the infantry. In the latter arm pikes had disappeared, muskets with flint locks had replaced the old heavy arm of the musketeers and the bayonet was introduced. Although increase in the number of guns had taken place, the want of mobility detracted from the importance of the arm. The carriages and wagons were driven by wagoners on foot who were not anxious to expose themselves to an enemy's fire, and consequently the guns had to be dragged about on the field of battle by ropes, and were often stationary during an action. The ammunition consisted of a charge of powder equal to $\frac{2}{3}$ rds. the weight of the shot, and tin boxes or canisters holding nails, old iron, or lead balls; while sometimes lead tarred balls, arranged round an axis and kept together by a net, were employed, this species of ammunition receiving the name of *grape*. Hollow projectiles had made their appearance and mortars were attached to the train for the destruction of villages. The artillery was generally divided into three Brigades, the heavier guns being collected at the centre, and the lighter pieces disposed on the flanks.

In 1732 the experience of the wars which took place towards the end of the reign of Louis XIV, bore fruit. Lieutenant-General M. de Valière perceiving the evil which resulted from the confusion in the variety of calibres, and in the forms and dimensions of the guns, proposed to remedy this state of things. The adoption of his suggestions fixed the calibres at 24, 16, 12, 8 and 4 prs, the dimensions of each class

of gun were made uniform, field guns and carriages were lightened and the guns were separated into brigades. Mobility, however, was disregarded, and the carriages were not made of uniform patterns, the horses were harnessed in file, and no improvement was effected in teaming the horses.

In a few years the matériel was however further improved by the introduction of serge cartridges, the abolition of the ladle, the invention of shot with wood bottoms or *sabots* attached by the bands. Regimental guns 4 prs, were used in the proportion of one per battalion, and 8 inch howitzers were manufactured. The French Artillery remained in an indifferent state until the great reforms effected by General Gripeauval in 1765. This officer had been sent to Austria during the Seven Years War, and had held an artillery command under Prince Lichtenstein. He was an able officer and possessed great administrative powers. Struck with the improvements in artillery effected by Austria, on his return to France he strove to build up a complete system both of *personnel* and *materiel*, creating a distinct materiel for field, siege, garrison, and coast artillery. Possessed with the then advanced ideas that field artillery should be mobile, and that its object was to fire on the enemy's troops, to destroy entrenchments, walls, and other obstacles, he at once dismissed from the park pieces of greater calibre than 12 prs, selecting for field purposes the 12, 8 and 4 pr guns. Passing by the ideas previously held that guns could only be employed when protected by parapets he reduced the length which had been necessary for the service of guns in embrasures, and consequently the weight. He reduced the charge and the windage. Experiments were made and the proposals were the subject of great discussion. It is needless to remark that like many reforms of a later date, the adherents of the old system utterly denied that the changes would be an improvement, pointed to the glories achieved under the older system, and were so far triumphant that although the reforms of Gripeauval were inaugurated in 1765, they were abolished in 1772. In 1774 however, they were re-introduced and in 1776 this illustrious artilleryman when he became first Inspector General of artillery was able to carry through the improvements and reforms which will ever cause his name to be celebrated. For many years artillery has been separated into regimental or battalion guns, artillery of position, garrison and siege artillery; the position guns being distributed in large batteries on the flanks or in front of a position, and the siege artillery collected in a park or train. The field artillery of the new system included 4 pounder regimental guns and for the park 8 and 12 pounders with 6 inch howitzers; the ammunition was improved by the introduction of "case" canisters of sheet iron holding cast iron balls and old grape and case being abolished.

The carriages were constructed on a uniform model strengthened with iron, the limber wheels heightened and the draught diminished. Iron axletrees were introduced, straight pintles on the top of the lim-

bers and pales took the place of shafts. Boxes on the carriage held part of the ammunition. Travelling trunnion pales were introduced. The horses were harnessed in pairs, instead of in file as formerly, and the prolong of rope was introduced to unite the trail of the gun and the limber in slow retiring movements. A new ammunition wagon carrying fixed ammunition was also invented. The service of the guns was improved by the introduction of cross headed elevating screws and tangent scales, the latter experiments exploding the old false idea with regard to the absolute flatness of the path of a projectile. The manner in which the teams were driven remained much the same but the bricole was introduced, a collar with rope and hook to which the gunners and foot soldiers harnessed themselves. For siege and garrison service Griebeauval adopted the 16 pounder and 12 pounder guns 8" howitzer, and 10" mortar the 12,10 and 8" power mortars being introduced in 1785.

Siege only differed from field carriages in having shafts in lieu of poles. Griebeauval introduced for garrison service a carriage with wheels in front and a truck in rear running upon a circular racer. The great step made was in a uniform construction being adopted for all materiel and the parts susceptible made interchangeable.

In 1765 the personnel of the French artillery was re-organized. The field artillery with an army was divided into regimental guns and corps of reserve artillery. This latter portion was subdivided into divisions of 8 guns of the same calibre. A company of artillery was also attached to each brigade of 4 battalions. The battery of division was thus made the tactical unit, with guns, munitions and gunners complete, the horses and drivers being added at a later date.

The French horse artillery dates from 1791. Horsemen and gunners were combined, each class learning the work of the other. Companies were attached to a battery of six guns, and in 1793 when the divisional organization was adopted artillery was attached in divisions in proportionate strength, and regimental guns were abandoned and entirely suppressed by Napoleon in 1796. The reforms of Griebeauval bore fruit in the wars of the republic. The tables of construction which had been drawn up secured a uniformity of manufacture, the reduction of the weight of the gun gave mobility to the field artillery and enabled the artillery to be used with the greatest effect in the new tactics which Napoleon employed with the raw levies with which he fought the veterans of other European powers. The batteries which had been reduced in the number of guns from 8 to 6, were horsed by contract, and as might be supposed the horses, the harness and the drivers or wagoners were often in the most deplorable condition. In 1800 this evil was remedied by the establishment of a *driver corps* of soldiers.*

* For the account of the artillery of France and Germany the acknowledgements of the writer are due to "Conférences Régimentaires," Maxwell's translation of Taubert, the Revue d'artillerie, and Revue Militaire de l'étranger.

PRUSSIA.—The State of the Prussian artillery in the early part of the century was not good. Financial pressure supported the official neglect of an arm as expensive as it was soon to be important. At the death of Frederick I, in 1740, there was only 1 battalion of field artillery of 6 companies, and 1 battalion of garrison artillery of 4 companies. Nor did Frederick the Great at first place much value upon its services. But the tendency towards mobility in artillery soon manifested itself, the weight of the guns was reduced, and Frederick after experience became convinced of the necessity for creating an efficient field artillery. In the Silesian Campaigns 1744-45 the field artillery consisted of 12 and 24 pounder guns, with howitzers of various calibres. The efforts to lighten the guns were not successful in establishing the principle of mobility, as no corresponding advance took place in the construction of carriages. The artillery gained nothing in mobility by lightening the large pieces, for they were unable to stand large charges and there was loss in power. The earlier campaigns of the Seven Years' War proved this, and after the Battle of Rossbach, between the Prussians and the allied French and Austrians Novr. 5th 1757, in which action the Prussian Artillery did much to contribute to Frederick's victory, a return was made to heavy guns and heavy charges. But this change was insufficient, for the gradual destruction of the veteran Prussian infantry, and the excellent and well-handled Austrian Artillery, both needed to be counter-balanced by greater mobility and efficiency on the side of the Prussian Artillery. The first Horse Artillery was formed by Frederick in 1759, consisting of a battery of ten light 6 prs. A heavy 12 pr, weighing about 26 cwt. was also introduced into the field artillery, and the end of the Seven Years War showed that Prussia had endeavoured to bring heavy artillery into the field while the other European Powers had been bent upon lightening field guns. But the Seven Years War showed the Prussian monarch the power of the arm. The battle of Leuthen 1757, was "a day of honour for the Prussian Artillery," and although the Prussian light artillery was for long in an indifferent state, Frederick gave it a great impetus towards the admirable efficiency which it has subsequently reached. Frederick may be said to have created the Prussian field artillery by the adoption of a great number of light pieces, and especially howitzers. He formed the heavier guns into parks for the attack of fortresses, for the armament of important posts, and for the defence of positions, thus recognising the necessity of the distinction between field artillery capable of rapid manœuvre, and "guns of position." But up to the peace of Hubertsburgh 1763 the Prussian artillery was so far inefficient that it did not possess the mobility which that of other powers had attained. Consequently the field artillery was recast, and three kinds of 12 prs. were introduced with a heavy 6 pr, these calibres being retained until the end of the century. Frederick placed great value on howitzers, and made much use of them against entrenched positions, and at the close of the war, after experiments on a large scale had been made, the king ordered 40 heavy howitzers to be attached to each army corps. The horse artillery brigade or battery established in 1759 was twice destroy-

ed but reorganised a third time in 1760 and then consisted of six 6 pr guns and two 7 pr howitzers, forming what is known as a "mixed battery." At the termination of the three Silesian campaigns the Prussian Artillery had been increased to 3 regiments of foot artillery of 10 companies each and 2 horse artillery regiments, a fourth regiment of foot artillery was added in 1772. In the campaigns of 1778 the horse artillery batteries had increased to seven, and at the beginnit the 19th century to as many as twenty. In 1786 the 4 foot artil regiments consisted of 9 battalions or 45 companies, 10 garrison fortress batteries, and 3 horse artillery batteries.

The increasing importance of artillery may be shown in the fact th in the first Silesian wars the proportion of guns to men was between $2\frac{1}{2}$ ar 3 per 1000, while at the end of the Seven Years War the rates had increase to 5 and 6 per 1000. In 1780 Frederick the Great had 972 guns or $5\frac{1}{2}$ pr 1000. Nothwithstanding the many defects which characterised the Prussian Artillery of this epoch, the wars of Frederick brought forward thre great tactical principles in the employment of artillery.

1st. That smaller batteries of guns might be established at impor t points in the line of battle in lieu of the old formations at the centre and flanks.

2nd. To engage in battle and protect the deployment of columns by light guns.

3rd. To change the position of batteries according to the course of the action.

AUSTRIA AND RUSSIA.—The Seven Years War brought forth fruit in other countries besides Prussia. The Austrian Artillery was re-organised by Prince Lichtenstein, appointed chief of the artillery. The Russian Artillery was also brought into a comparatively high state of efficiency. The Russian military authorities thoroughly acknowledged the importtance of the arm and employed large numbers of guns, while each Dragoon regiment had 3 licornes or howitzers attached, which equipment with mounted gunners formed a species of horse artillery.

From the experience of the Seven Years War, were derived three important steps in the organisation of field artillery :—

- (1). The separation of position guns into batteries of 5, 8, or 10 pieces.
- (2). The union of howitzers in separate batteries.
- (3). The formation of light or horse artillery.

The Austrians employed their artillery with great effect during this century. They distributed the guns in "reserves," for the centre and each wing, and the fourth as a *grand reserve*. While their tactical

Pad

Ra

NDU

arrangements were not always in advance of their great opponent, the general excellence of their artillery was pre-eminent and afforded a model to other nations.

At the commencement of our wars on the continent in 1793, the British artillery was in anything but an efficient condition. The guns were dispersed among the infantry, they were horsed in single train, the ammunition was packed in rough deal boxes, the ammunition wagons were cumbrous and ill constructed, the drivers were mere carters on foot with long whips and the whole equipment was scarcely able to break from a foot's pace. Prior to the Peninsular war, however, the exertions of an able officer, Major Spearman, had done much to bring about an improved state of things. Horse artillery had been introduced in 1793 and driver corps established in 1794. The battalion or regimental guns were abolished in 1802 and field batteries or " brigades" of six guns were formed, horse artillery batteries being styled "troops". Military drivers were introduced, the horses teamed in pairs, the drivers being mounted on the off horses while 8 gunners were carried on the limbers and wagons. The equipment was lightened and simplified, the ammunition was properly packed and a correct system of manœuvres was introduced. The invention of shrapnel shell by Major Shrapnel in 1803 and the transformation of the rocket from a mere signal to a destructive engine by Sir W. Congreve in 1806 also added to artillery power. The composition of a troop of horse artillery from 1805 to 1807 was about as follows:

		Men.					Animals.	Carriages.
		Officers	N. C. O.	Grs.	Drs.	Artifi- cers		
Horse Artillery	... ...	5	14	85	60	0	horses 164 mules	19
Driver Corps	... ...	0	1	0	20	3	36	0

The composition of a field " brigade" between 1808 and 1816 was as follows.—

		Men.					Animals.	Carriages.
		Officers	N. C. O.	Grs.	Drs.	Artifi- cers		
Horse Artillery	... ...	5	17	123	0	0	horses 160 mules	19
Driver Corps	... ...		9	0	96	10	10	0

The troops of horse artillery were armed with five guns (6 or 9 pounders) and one 5½" howitzer. The field brigades were likewise armed with five guns and one howitzer the guns ranging from light 6 pounders to 12 pounders. At Waterloo there were 4 different armaments for field brigades. The Carrier Corps raised in 1794 consisted of a few subaltern officers with non-commissioned officers, artificers, drivers and horses. The corps was divided into troops, the addition of one of which to a company of foot artillery converted it into a field "brigade." The horse artillery possessed both drivers and horses and required very limited assistance from the driver corps.

The detachment of the Driver Corps was separated from the artillery in discipline and the officer (a lieutenant) ranked after the R. A. Officers. The troops of H. A. were armed with 5 guns and one 5½ inch howitzer, and in 1807 a complicated arrangement existed by which two guns were 9 prs. or heavy 6 prs. and 3 were light 6 prs., the experience of war however obliged the discontinuance of this mixed armament, and the simpler plan was adopted of having the 5 guns in the same battery of one nature.

At Waterloo there were four different armaments for field "brigades":—

Five 12 prs and one 5½ inch howitzer (heavy).

" 9 "	Do.	Do.
" 6 (heavy)	Do.	Do.
" 6 (light)	Do.	Do. (light).

Captair Heine gives an interesting summary of the employment of artillery in the Peninsular War in No 5, Vol. VIII, Progs. R. A. Instn. 1873. At the combat of Roriça Geary's battery moved at a trot and even at a gallop, an unheard of pace for artillery in these days. In the first campaign in Portugal Sir Arthur Wellesley was greatly hampered by the bad horses and want of mobility of the batteries, and we are told by Sir A. Fraser that few instances occurred in which the men were mounted on the carriages. Numberless examples afford proof of the great evil in the want of mobility of the field artillery. By the end of the war matters had somewhat improved and although the wagon system was as regards mobility inefficient, the French Officers were loud in their praise of the English Artillery both in personnel and materiel.

In 1815 the Royal Artillery numbered 23,085 of all ranks, but after the peace it was reduced and in 1819 consisted of 6,881 of all ranks.

The organisation was also placed upon a reduced scale, troops of horse artillery and field batteries being maintained on a skeleton strength of 2 guns each. In 1822 the Driver Corps was abolished and the men and horses distributed among the 9 field battalions, the men being enlisted as *gunners and drivers*. This system, although it obtained for some years, did not conduce to efficiency and for the very obvious

reason that it is difficult to find a sufficient number of men who can possibly combine dissimilar duties, the nature of which requires a difference in physique, in training, and in aptitude. In 1827 field "brigades" were styled field "batteries."

During the Peninsula War field guns and wagons appear to have been drawn by 6 and 4 horses respectively, but in 1820 a committee proposed that a heavy field gun should have 8, and a light field gun 6 horses and the latter number also be given to all other carriages. The Duke of Wellington however objected to these numbers as excessive. It was shewn, however in 1826 in Portugal that this was not the case, and His Grace was at last obliged to sanction the adoption of the proposed numbers on this service. For some years the artillery in common with the other branches of the British Army, was kept down to the lowest state, and we find Sir Robert Gardiner affirming that "it is a delusion to say England has a field artillery," and that if a sudden necessity arose only 14 guns fully equipped, could be sent on service.

In 1848 all the troops of horse artillery were increased to 4 pieces, and in 1852, with the field batteries, to 6 guns, the field and horse batteries being increased to 20 batteries, giving a total of 120 guns. Shortly before the Crimean War there was an increase of several battalions, but notwithstanding these various augmentations the field artillery during that campaign did not equal 2 guns per 1000 men, while the Siege Train never had more than two reliefs during a bombardment. The armament of field artillery had altered since the days of the Peninsula. The heavy and light howitzer had been superseded by General Millars 24 and 12 pr. howitzers; the 32 pr. howitzers had been introduced to accompany the 12 pr. gun; the heavy 6 and 3 pr. guns the 1 pr. mountain gun had been withdrawn in 1847; the field batteries were now composed of 4 guns and 2 howitzers (1852); and in 1847 the rocket troops had been abolished, and in 1854 rocket "sections," attached to horse and field artillery batteries.

In the Crimean war the field artillery consisted of Position batteries of three 18 prs. and one 8 in. howitzer and of four 12 prs. with two 32 pr. howitzers, of field batteries having 9 prs. and 24 pr. howitzers, and of horse artillery troops of 6 pr. guns and 12 pr. howitzers. The position battery of 18 prs. was hored by 12 horses harnessed four abreast, the drivers riding on the near and off horses. In 1858 the experience of the Crimean war being conclusive with regard to the *gunner* and *driver* system, drivers were permanently attached to each field battery. Up to 1859 the Royal Regiment of artillery had increased to 15 battalions of field garrison artillery and 1 brigade of horse artillery, and the pernicious system prevailed of converting garrison companies into field batteries, and vice versa.

The head quarters of the horse brigade and of the battalions always remained at Woolwich, the troops or companies proceeding to out

stations or foreign service on two rosters. In 1859 a reorganisation took place by which the whole Regiment was divided into Horse, Field, or Garrison Brigades, the idea being to effect reliefs by whole brigades instead of by batteries, and to make each brigade an administrative unit complete in itself with its own staff, &c.

In 1862 the Royal was amalgamated with the Indian Artillery of the three presidencies, and the total strength of establishment was 5 Horse, and 25 Field and Garrison Brigades.

It would be impossible within the limits of this essay to do more than allude to the various changes which have taken place during the nineteenth century in the *personnel* and *materiel* of artillery.

The personnel had been greatly improved by the systematic military education given at the Royal Military Academy, and separated from the corps of Royal Engineers. In *materiel* up to the introduction of rifled guns many changes had also occurred. The advantages of rifling had been long known but was not practically applied to ordnance until 1846. Siege guns were rendered more effective by the substitution of more powerful S. B. pieces and the introduction of shell guns. Rifled guns were first used by the British Artillery at the siege of Sebastopol but with no great effect, as a new system was grafted upon guns of old form and construction. The introduction of the breech-loading Armstrong gun into the service caused a great alteration in the equipment of the British Artillery, but these have now been superseded by 9 and 16 pr. muzzle-loading rifled guns, and it will only be necessary to devote a short space to this gun and equipment so far as the history of artillery is concerned, for to that section of the subject it would appear to be relegated, as the armstrong B. L. gun for field and horse artillery has now been entirely replaced by the muzzle-loading gun; except in a few batteries in India from which it will gradually be withdrawn. In 1858-9 the Armstrong system was adopted as the rifled arm for field artillery. The 7 inch gun of 82 cwt. was introduced for garrison service and even for siege purposes, 40 prs. on block trail travelling carriages for batteries of position, while 20 prs. were intended for the same or heavy field batteries, the 12 pr. of 8 cwt. being for the armament of field and the 9 pr. of 6 cwt. for horse artillery. The wooden carriages for the 20, 12, and 9 pr. B. L. R. gun have a similar construction, the two heavier carriages have a gun metal "saddle" worked by a lever and hand-wheel for traversing, all being provided with the ball and socket elevating screw. The *limbers* and *ammunition wagons* were constructed of an improved pattern, and the whole equipment showed a great advance in efficiency, 124 rounds of ammunition per gun could be taken into action by the gun carriage and *ammunition wagon*, each box holding 15 rounds.

		Rounds.
Gun-carriage	$\left\{ \begin{array}{l} \text{Limber} \\ \text{Axletree boxes} \\ (\text{case}) \end{array} \right\}$	30. 4.
Wagon	$\left\{ \begin{array}{l} \text{Limber} \\ \text{Body} \end{array} \right\}$	30. 60.
		124.

The different proportions of projectiles being :—

Case shot	...	..	16.
Common Shell	...	...	30.
Segment Shell	...	...	78.
			124.

In addition there was the *first reserve* in a second line of wagons.
(6).*

The war establishments as laid down in 1870 for Armstrong batteries were :

Detail of a BL. R. 9 pr. Horse Artillery Battery.

Men.	Horses.		Carriages.
Officers ... 8	Riding ...	79	Gun Carriages (1 spare) ... 7
N. C. Officers ... 26	Draught ...	162	Rocket Waggon 1
Gunners ... 80	Bât ...	8	Ammunition Wa- gons (1 S. A.) 12
Drivers ... 100			Other Carriages 5
Trumpeters ... 1			
Artificers ... 13			
Total ... 228		249	Total ... 25

* 5 for R. H. A.

Detail of a BL. R. 12 pr. Field Battery.

Men.	Horses.	Carriages.
Officers ... 8	Riding ... 32	Gun Carriages (1 spare) ... 7
N. C. Officers 34	Draught ... 212	Rocket Wagon 1
Gunners ... 100	Bât ... 8	Ammunition Wagons (6 S. A.) 18
Drivers ... 120		Other Carriages 5
Trumpeters ... 2		
Artificers ... 13		
Total 277	Total 252	Total 31

A 40 pr. B. L. R. position battery has only 4 pieces with 30 carriages, and 40 rounds of ammunition per gun. These batteries are arranged for teams of 12 horses, 4 abreast, and can be used either with ordinary artillery or farmers harness. For mountain equipment various guns have been proposed and tried, of late years different patterns of B. L. 6 pr. guns, and M. L. R. 7 prs. of bronze and steel, the latter has now been adopted and will be mentioned under the head of the existing artillery of the British Service.

A very few remarks may be allotted to the progress of the Indian artilleries in *personnel* and *materiel* up to the date of their amalgamation with the Royal Artillery. At the end of the 18th century the artillery in India was considered insufficient by the highest authorities. In 1800 Lord Wellesley pronounced "the fixed establishment to be defective at all the presidencies" and in 1801 a considerable augmentation took place. Although the laurels which the Indian artilleries have since won have, in a measure, overshadowed the brightness of their former glories, it is well to remember the part they played in the wars with Hyder and Tippoo, and those campaigns in which they so greatly assisted to lay the foundation of the Indian Empire. In Lord Lake's second campaign against the Maharattas 1804-5 it may be well to recur to the sieges of that war, but merely to point out a fact which it will be well to bear in mind, viz: the inadequacy of the siege *materiel* used. In India where dashing field operations against timorous or ill-disciplined foes have been at most invariably rewarded by success, it is the fashion among even experienced men to decry any attempt to introduce a scientific study of war and its operations. We have so often conquered in spite of the most elementary precautions in warfare that some colour is given to the belief that it is only necessary to fight

in some fashion or other in order to reap victory. The long roll of successes hides the numerous failures and losses which might have been avoided by a better conception of what war is, whether in administration or on the battle field. But perhaps the strongest examples of miserable want of forethought and military knowledge is shown in these early sieges. The cumbrous Military Board, wanting in individual responsibility, failed to *prepare*, failed to discern the moment when expenditure was really necessary, failed to appreciate the military necessities of the day, in a word failed to accomplish the most elementary conception of the meaning of war. The ordnance supplied was utterly insufficient, the wretched hired country carriages were unable to supply the want of properly organised transport, the Engineer matériel was either totally wanting or defective, no proper dépôts of matériel were provided, nor correct means taken to ensure success. One of the most signal instances of failure was in the unsuccessful assault of Bhurpore no less than four times.

In 1807 an organized corps of Ordnance Drivers for the bullocks was established and greatly tended to the efficiency of the service. In 1815 the Bengal Artillery consisted of 1 Horse Brigade, 3 European Battalions, and one native battalion. The Madras Artillery in 1819 had 1 Horse Brigade, 2 Europeans and 1 native battalion, while the Bombay Artillery consisted of a somewhat smaller force. About 1814 rockets were introduced into the Indian Service, the artillermen being mounted on camels and the rocket cars drawn by horses. For many years the Indian artilleries were kept in a low and inefficient state, and there appeared to be no one in authority either in England or India who had the power or knowledge to place the arm on a proper and efficient basis. In 1817, however, the usual opposition to the introduction of any thing from European experience having gradually lessened, the guns of the artillery were collected into batteries of horse artillery, and field bullock and horsed batteries. About 1817-18 the supply of matériel was placed in a more efficient state, and various improvements introduced.

Permanent Select Committees were introduced to assist Government in coming to a decision on questions of matériel. Horse artillery was separated from foot, and horsed field batteries augmented. In 1827 a curious retrograde step was taken, abolishing horses for the field batteries after first bringing them up to a comparatively efficient state, but in 1834 the Court of Directors being at length satisfied of the superiority of horses over bullocks for artillery purposes directed the substitution of the former for the latter. The history of the Indian artilleries for the following years cannot be given in any detail. It was a history of futile efforts to impress on the Indian Government of the day the necessity for efficiency. The artillery was a favorite ground for experimental organization of a kind which had neither the ability nor desire to learn the lessons taught by European nations, but was content with, the self-contained pride of ignorance. In 1828 reductions took place and the artillery was condemned to inefficiency, until 1841 when

Lord Auckland did something to improve it. In 1845 however, the Affghan Campaign, the services of the artillery with the Army of Retribution, and the Gwalior Campaign having shown the extreme necessity for a powerful artillery, the Governor General Sir Henry Hardinge in conjunction with Sir George Pollock, Military Member of Council, introduced several improvements. Horsed field batteries were increased and rendered efficient, elephant draught was adopted for siege guns and heavy wagons, and the whole Indian Artillery reorganized on a better principle.

Of the glorious and eminent action of the artillery arm in the Sikh Campaigns space only permits the mention. The Indian Artillery was at last placed in its proper position and although many errors both as regards organization and materiel existed, it was brought into a state of great efficiency. The maximum strength which the Indian Artillery reached was at the commencement of 1857, when there were no less than 65 European, and 66 Native troops and companies with a total of 524 field guns. The Campaigns of the Indian Mutiny were the last in which the Indian Artillery was engaged but the magnificent roll of victories now added to the history of the Royal Artillery must always be perpetuated in the history of the individual batteries and in the memories of Englishmen. It sprang from the Royal Artillery, it has now returned to its parent with such a list of triumphs as may make the latter receive it again with pride. Changes in the Indian Artillery materiel during the 19th century followed, though tardily, corresponding changes in the British Service. The Griebeauval pattern gun and ammunition carriage was introduced about 1810. This gun carriage was "double cheek" or "bracket" and was superseded in 1823. The ammunition wagon was the French "caisson" and was only superseded by the royal pattern. Mountain train equipment for India has undergone many changes, the carriages varying between extreme lightness, and excessive strength and weight. In 1823 a general reform of the materiel took place, and the "block" trail was introduced for field gun carriages. The European horse and field batteries were armed with 9 pr. guns and 24 pr. howitzers, and the Native Artillery with 6 prs. In 1834 the whole of the horse artillery was armed with 6 prs. and 12 pr. howitzers. In 1836 a special board of artillery officers was appointed to assimilate the ordnance equipment throughout India. "Indian pattern" carriages were proposed, but were never completely adopted, and the reforms of the Committee were never properly carried out. Indeed, up to quite a recent date and notwithstanding the amalgamation of the Royal and the three corps of Indian Artillery, unnecessary differences existed in the artillery equipment of the three presidencies. Horses were first used experimentally for the draught of guns in 1801. In one respect India was and has remained in advance of the artillery in England, for the Indian system has always been to carry gunners on the off horses of the team, and on seats on the axletree boxes of the gun, thus rendering it possible for field batteries to move at a rapid rate with a strong detachment. It was not until 1818 that horses commenced to supersede bullocks for

field batteries. About 1835 efforts were made to apply the Camel to the draught of guns, but the practical experience of war decided against the experiment. Elephants have been, and are used with success for the traction of position and siege guns, but in consequence of their usual unsteadiness under fire they are obliged to be withdrawn in action, and their place taken by bullocks. Since the amalgamation the partly obsolete Indian materiel has been gradually superseded by improved patterns to the great increase of efficiency, but also of expenditure.

(To be continued.)

II.

NOTES ON A NATIVE ARMY HOSPITAL CORPS FOR INDIA,

by Surgeon G. J. H. EVATT, M. D. Army Medical Department.

SECTION I.

Introductory.

I propose in the paragraphs which follow, making some observations on the important subject of an Army Hospital Corps for carrying out the nursing and various routine duties of the Military Hospitals in India with more special reference to those of the European Garrison in this country.

1. One cannot claim for these remarks any merit of originality. The subject has long commended itself to many of the officers of the Army Medical Department serving in the Indian Garrisons, and especially to that officer whose lamented death at the post of duty terminated a life devoted to the British Soldier, Surgeon General George Beatson of the Army Medical Department.

The more his letters and recommendations are studied the higher must be the estimate formed of his devotion to the soldier, his admirable powers of organization and co-ordination, and his thorough sense of order and discipline, qualities almost as essential to the Military Surgeon as to the Military Commander.

Among the many medico-military subjects which occupied his attention the question of a Native Hospital Corps did not escape, and so far back as the year 1867 he drew up a memorandum which well nigh exhausts the subject—but ten years have elapsed since then and we are still without the Corps.

This paper of his is to be found in the A. M. D., reports for the year 1867 page 365 but it seems necessary to disinter it from its burial place and bring the subject in the first place before the Medical Officers of the service to whom it is of vital importance and secondly before the Military Officers to whom the question of Army Hospital efficiency should not be an uninteresting study.

3. Every Great Captain of the art of war and indeed every military leader who has risen out of the groove of ordinary military routine has recognized the importance of this branch of Military Detail, and to no officer of any existing Military Force in any Kingdom is the hospital question so vital in its bearings as to those of the British Service.

Not Germans, nor Frenchmen, nor Austrians are scattered over the world as our soldiers are, and Russia alone can compare with us in the

extraordinary chances that send the soldier on service from Halifax to Peshawur and from Hongkong to Jamaica or the Cape. Such varieties of climates mean varieties of disease and to have a thoroughly efficient medical organization to afford aid to the sick soldier, cannot be a secondary consideration. It bears most markedly on the *morale* as well as the *physique* of the soldier, and here in India it may safely be said, that until a Hospital corps is organized, through efficiency in Medical arrangements will be absent.

It seems a waste of time to point out how deeply interesting and important the question of a Hospital Corps is to us the Medical Officers of the service stationed in this country. Perhaps no profession needs aid in our work so much as we do. The nurse has well been called the right hand of the physician, and if this be true in Civil life, where relatives and friends are always near to tender nursing aid in sickness, how still more essential is it in the Army life where relatives are far away and the nursing must devolve on those bound to the sufferer by the ties of comradeship and duty alone.

For years in England we were trusting to the rude and untrained soldier from the ranks to assist us as a nurse, but now we have in that country and the Colonies a Corps specially trained to nursing duties, detailed for Hospital duty alone, and rapidly assuming an efficient and working condition. In India we are still without these assistants and our labours and responsibilities are much increased by their absence. The tour of service in India is now so much equalized for all Medical Officers, and the necessity for knowing the Indian routine so important for all Military Surgeons, that they should hail as a real boon the organization of a corps which would be their own, and to whose training and developement they could all lend a hand. That such a corps will be embodied is but a question of time. The principle has long since been recognised.

No difficulty stands in the way and in this, as in many other movements it is but the first step that is difficult.

4. My attention was first drawn to this hospital corps subject, by reading Dr. Beatson's remarks on the hospital servants in the A. M. D. blue book for 1872 page 163-164. In which he says "on the subject "of hospital servants as at present procurable, I can only say they are "in many instances as indifferent as they can be. At Peshawar I saw "not only boys but literally children mustered as ward coolies, the "Commissariat declaring their entire inability to procure any better "hospital servants. The difficulty in this respect is increasing every "day and for it there is only one remedy viz: to have an enlisted "body of men as hospital servants. A native Army Hospital Corps. "Until this fact is recognized the administration of hospitals in this "country will be imperfect and in the hour of utmost need there may "be no hospital attendance forthcoming"—"for my part I regard it as "a most vital element towards any real improvement in Hospital "organization in India."

These words are very strong words and coming from an officer of Dr. Beatson's position and acquirements they deserve the highest consideration.

5. At page 168 of the same report, while writing about the Hasan Abdal camp of exercise in 1873 he again uses almost the same words when referring to the camp Hospital arrangements there.

6. In the autumn of 1875 I was again very much struck with this question. The 51st Foot at Fyzabad, a very favourite Station, received orders to march to Peshawur, a very unhealthy and indeed for the low-country Hindustani a dreaded station.

For weeks before the Regiment marched the hospital servants began to desert, if such a word may be used in reference to men not sworn in to the service, nor bound to it in any way save by the slender bonds of four rupees per mensem—pay. When the eventful day did arrive, quite a number of the servants had disappeared and one could not help thinking if this was the result of an order to march to Peshawur, what would be the result of an order to march to Kabul, to Kandahar, or to Herat, or to embark for field service in Egypt.

7. Again when serving with the 25th Foot just arrived in the country one could see very well that the English soldier just arrived in the country, did not recognize in these badly dressed undisciplined Native servants, the Indian representatives of an Army Hospital Corps.

Without uniform, without a badge or distinctive mark, dressed in seedy native dress and but little trained in Hospital work, it was evident that the English soldier new to India looked upon them as hospital orderlies.

These things impressed upon one the necessity of having a regular corps of Hospital servants organized, and the following paragraphs contain some views on this subject.

8. In the first part of this paper we will notice the existing condition of the nursing staff of our Army Hospitals in India, and in the second discuss some alterations and changes proposed, all tending towards corps organization of the Native hospital servants.

SECTION II.

The Existing Condition.

9. When an officer of the Army Medical Department comes to serve his five years tour of service in India he finds the hospitals nominally "Regimental" worked by the following Staff.

1st The Medical officers, officers of the A. M. D. temporarily attached to the corps.

2nd The Apothecary class a warrant grade with Hospital apprentices of N. C. O. grade carrying out the dispensing of drugs, minor dressing, and the making out of the indents for rations upon the Commissariat.

3rd Hospital Sergeants staff Sergeant of the Corps, and the only representative, except indeed the patients, of the regimental principle.

This official keeps the statistical records of the corps, supervises the discipline of the patients and has the charge of all the Barrack furniture in use in the Hospital.

4th The Purveyor. A Commissariat subordinate, having custody of the bedding and clothing before issue to the patients, and also responsible for the supply, but not the issue of the Commissariat rations.

And 5th and lastly. The Medical native staff some 50 to 60 strong divided into compounders, water carriers, sweepers, cooks, washermen, and last but far from least the ward coolies, the real nursing staff into whose hands the sick European soldier is confided to be attended to when ill. It is true that unofficially we fall back upon the barrack room for the aid of European private soldiers to nurse bad cases and I have known 19 men from a single company so employed, but that arises principally from the defective condition of the native nursing staff and it will be the aim of this paper to point out that although this adventitious European nursing element can never be wholly dispensed with in a hospital in this country, yet that by a judicious training of the native staff 9-10ths of it may be abolished with perfect safety to the sick, and no sacrifice of efficiency in any way.

10. Probably the true principle to act upon with reference to the supply of European hospital orderlies in this country would be to extend in a certain degree the service of the English Army Hospital Corps to India and by providing a Hospital Sergeant and a few orderlies of this Corps in each large Garrison a supply of hospital sergeants and orderlies could be obtained. This however is not an important matter as we can obtain European aid from the Regiments as a rule, and it is to the developement of the native servants this paper is devoted.

11. The permanent native establishment of a European Infantry hospital in an Indian Garrison is seldom under sixty (60) men and they fill the following offices. 1st *Compounders* working in the dispensary under the Apothecaries. 2nd *Dressers* carrying out the minor dressing in the wards. 3rd *Ward coolies*, the nurses of the sick soldier, who give him his food, arrange his bed, change his clothes, watch by him when seriously ill, clean the wards and are responsible as a rule for everything within their wards. 4th the *Bhesties* or water carriers supplying water. 5th *The Cooks*. 6th the *Sweepers* who clean

up the Hospital and carry out the conservancy rules. 7th the *Kahars* or Dooly (litter) bearers.

12. The *Chumar* or leather workers caste as a rule furnish more than half of these servants, thus all the ward coolies, the compounders, dressers and cooks belong to it and they have furnished the Hospitals with these servants for generations.

They come from the Dinapore and Arrah country, and seem to have an hereditary claim on hospital service. The Doolie bearers are Hindus of the *kahar* caste. The Bhesties are all Mussulmans, and the sweepers belong to the Hindu *Mihtar* caste.

There are now and then Mussulman compounders and ward coolies, but as a rule the Mussulman element is confined to the waterman's duties in a Hospital.

13. How a man becomes a compounder, a dresser, or a ward coolie is not quite apparent. The ward coolies son may be a cook, the cook's brother may be a compounder, the compounder's uncle may be a dresser. They seem to lapse into each billet by natural selection although as a rule the compounder is a more educated and intelligent man than the others.

14. These native servants of every rank and grade and office are not enlisted or bound to the service in any way save by their slender monthly pay. Any day they may desert, and no legal punishment lies against them.

They cannot be punished for military insubordination, although liable to field discipline as camp followers. They are liable to dismissal by their superiors on very petty examinations into their misdemeanours.

They can only be punished for neglect by fining and this although constantly done, is quite illegal.

15. They receive no uniform from the state, nor badge of any kind. They may any day be stopped by a sentry or seized by a military policeman for entering their own lines. They receive no medals for field service, nor promotion nor rewards for heavy cholera epidemic service. No camp equipage is allowed for them, nor carriage on the march if they fall sick. They lie for shelter under the walls of the hospital tents during the bitter cold of a Punjab night in camp or are alternately roasted, and drowned in that most trying of situations a cholera camp in the height of the monsoon. If they get sick there is no arrangement for sick leave, or for pay while ill. There is no good conduct pay nor increase of pay for long and faithful service. The young lad who joined yesterday receives the same pay as the old servant who served with Clyde in the mutinies or served in Umbeyla or in Hazara.

16. Their pay is so petty that one cannot compel them to be clean and respectably clad without knowing they will be hungry. They receive no instruction in nursing or in carrying out ward duties. Their responsibilities and labours are not defined, and in many ways they are but drudges for the sick soldier often querulous in his temper and exacting in his demands. The code does not define their duty, nor have they any book of instructions to learn their labour more thoroughly. They are not trained to be cooks, nor is there any place to teach them, hence they go on from year to year producing dishes often far from dainty. They are as expensive as they are inefficient, because a crowd of untrained men are needed to do work which a skilled and well paid few would do far better, and bad as they are, the moment the order to march to a bad station comes they often desert bodily.

They have some good points. They are sober to a degree, long suffering and tender to the sick soldier, and their services in the cholera wards are devoted and excellent. The Apothecaries teach them nothing, the Medical officers do not do so, and it is impossible to say definitely how they learn what little they do know.

With any attempt at organization there would be an immense improvement.

By enlisting them in a corps, giving them good conduct pay, and increase for length of service, giving them clothing, camp equipage on the line of march and in camp, pensions on retirement, putting them through an annual course of instruction, and a preliminary training in a central Hospital, giving them a Hindustani book of instructions and having frequent practise parades in their duties, a fairly efficient corps can be developed.

17. To day it would be absurd to deny we are quite unready for a large expeditionary force or a campaign like 1845 or 1849.

With our badly paid and uninstructed native servants we fall back continually on the barrack room for European duty men to attend to every serious case, and in the end the state is being deprived of a duty soldier while paying an inefficient native.

And this is only possible in peace. In the field we shall have in Asia no European soldiers to draw upon for nurses and we may feel much anxiety as to what we are really to do.

We do not propose banishing the European soldier wholly from the hospitals as a nurse, but we can reduce the necessity of his employment there by having a few English Army Hospitals Corps men in each garrison, but far more certainly and almost as efficiently by carrying out the aim of this paper with enlisting, developing, and training the present rough and ready crowd of servants into a properly constituted hospital corps to which subject we now turn.

SECTION III.

The Proposed Changes.

18. It is necessary in writing on this subject to say that the native establishments of the European Military hospital in India will always be numerous. The climate alone prevents Europeans performing menial duties to any great extent, and the sick rates for Europeans are often so heavy that if we were to ask for wholly European orderlies and Hospital servants we would have a mass of Europeans likely to get sick looking after a crowd of Europeans already sick. Such would be impossible on the grounds of efficiency and of cost, and what we should aim at, seems to be a fairly efficient native Hospital Corps supplemented by a few trained European soldiers of the English Army Hospital Corps. The more the General Hospital system spreads as it now is in every non Indian Garrison the more necessary it is to have a special body of European trained soldier orderlies upon whom the Medical officers of the Army can depend for the carrying out the nursing duties and indeed all duties of the Hospitals. Even with a few of these men we can do wonders. Why? Because they are our own corps. In them we can feel a deep interest—such men we can train to a high state of efficiency because they are always with us, and we know that the more we teach them the more useful they are to us, such men can learn a great deal, and unlike the rough and ready private taken hap hazard from the ranks and returned again to it when his temporary hospital service is over, we know that each case he attends to but makes the permanent Hospital corps man more useful and efficient as an assistant. We have in our English Army Hospital Corps which now serves everywhere but in India, a corps rapidly becoming efficient and which by comparison with the rough and ready orderlies of old days is as different as the perfectly trained duty soldier, is from the recruit of yesterday.

This Corps does not serve in India. But it seems to me that they could gain very much experience useful in the field in any country, if they did serve in India, and a Sergeant and three orderlies of this Corps serving in every garrison in India would be a great assistance to the Medical officers and furnish the men from whom good Hospital Sergeants would be developed. This however is a question of secondary importance to the primary one of the necessity of organizing the Hospital establishments into an enlisted Corps. Without that enlistment and the definite hold it gives the Government on the servant, all training or good teaching are impossible because the man may any day desert without the possibility of being punished. It will be advantageous to tabulate the various requirements in order.

19. *Title of the Corps.* The Corps to be named the Indian Hospital Corps or if necessary the Bengal, Bombay or Madras Hospital Corps, There seems to be little occasion to use the word "Native." And by ignoring this word, at any time hereafter the present Subordinate Medical Department including the Hospital assistants of the native

Army could be all merged under the one general title. There is no question but the title *subordinate Medical Department* is a strange one, and not at first understood by new comers to India. It is also a question if the Hospital Corps should serve only with the European Troops or why they should not serve in the Hospitals of the Native Army. This question however can be dealt with at any time hereafter.

20. *Enlistment and grading.* The whole question turns on this point; without enlistment, and the Military Discipline and thorough hold over the public servant that it entails, all else is useless. Enlistment acts in two ways. 1st in the duties it requires from the individual enlisting. 2ndly the protection and advantages it gives those whom are enlisted. Neither one nor the other now exists amongst the Native Hospital servants, the state has no hold on the man. The man has no claims on the state. Both suffer in consequence. The men then could be enlisted for a term of years, and the Hospital Corps would be simply another regiment of the Native Army doing duty in the Hospitals.

21. The various servants to be graded according to military custom into, sergeants, corporals, Lance corporals and orderlies, and to wear the distinguishing badges of their rank. The various servants may be graded thus. As senior sergeant, the present sirdar ward cooly. This is a most essential proceeding. Amongst the native establishments one man must be the head and responsible, and without doubt that man should be the senior servant of the nursing staff properly so called. One section of the Hospital staff is all important and that section is the existing ward coolie section. On them comes the whole pressure of the ward routine and nursing, and if anybody need developing these are the men. They are hourly in contact with the sick soldier and it is on their efficiency all his comfort depends. The senior servant then of the ward coolie class should be the chief native subordinate.

As sergeants on appointment:—Head compounders, assist: compounders, head cooks. It is essential to discipline not to have a crowd of men wearing sergeants' chevrons in this or any corps. They would simply lower the value of the grade and in the end be in the way. As sergeants after three to five years good service in their grade and recommended by their superior officers. Head Dressers. Head Tailors.

As corporals on appointment:—Assistant sirdar coolies, Head dressers. Head Tailors, clothiers, Head Bhesties, Head Dhobies, Head sweepers.

As corporals after 3 or 5 years service in their grade and being recommended, assistant dressers, Barbers, assistant head cooks.

As Lance corporals:—Mate ward coolies, barbers on appointment, Tailors.

As orderlies :—Ward coolies, shop coolies, cooks, bhesties, dhobies, sweepers, Purveyors servants, assistant tailors.

22. Dr. Beatson places the Head compounder as the senior Native servant in the Hospital and makes the sirdar ward coolie rank as a corporal only; on this subject there is something to be said. The compounder is quite a special employment and although ranking him as a sergeant is essential he must I think be subordinate to the sirdar ward coolie who is really the sergeant Major of the Native servants.

He also places head dhobies amongst the sergeant grade, while placing the sirdar ward coolie in the corporal grade. In working a hospital this would be very inconvenient as the dhobie is not in any way as important a man as the chief nursing subordinate and too many of the higher grade lower its value. One must have a responsible subordinate to exercise a general supervision over every sub-department and no man can do this so well as a good sirdar ward coolie. He knows what the cooks should do—what the sweepers should do—what the dhobies should do, what all should do, and he knows what the ward coolies should do. He then is the true chief subordinate.

23. It is essential that bodies of men doing duty with an Army should be organized on a military basis. Unless this be done confusion in titles will always occur, and the soldier will fail to understand the position of those with whom he comes in contact. Hence such titles as Steward, Ward master, Purveyor have little meaning to the average soldier, but "Hospital Quarter Master Sergeant," "Hospital Sergeant," "Hospital Commissary" are at once understood.

It is on this principal a Hospital Corps must be organized if it is to efficient from a Medico-military point of view.

It seems certain that if thorough efficiency is ever to be achieved for war hospitals, their organization should be as clearly defined and as definite and as self contained as that of a Battery of Artillery. With reference to these military titles it seems needless to say they imply no command over the sick soldier, it refers merely to internal Corps organization.

24. *Caste of men.* Caste is the one dead weight that will for years weigh India down in the struggle for progress. In a Corps like this, where the duties are so peculiarly and intimately connected with the European race, caste interferes very much. The mere handling of the food of the European would be defilement in the eye of a high caste Hindoo, and Indian Mahomedanism is so paltry a copy of Mahomet's original creed that even the Mussulman in Hindostan is entirely caste ridden.

The present class of Hospital servants are mostly *Chumars*. This is a very low caste. One might perhaps imagine such a body of men

so low in the social scale would be without prejudice, so low do they stand in the Indian caste scale, but as is often the case in every country it is quite the reverse.

The ignorant lower classes are far more bigoted and prejudiced than their superiors.

These Chumars are much tied down by caste rules, as regards the handling of the food of Europeans, and specially in the performance of various hospital nursing details. These details the Chumar class will not carry out and hence other servants of the Mihtar or Sweeper caste are required. Farther, they will not themselves eat the food Europeans eat, and this in a body of men serving with European Corps is a great inconvenience as regards rationing in field service or at sea.

25. Having seen to what a high state of efficiency the Mihtar or sweeper caste can be brought to by Military discipline, and regular training as in the case of the Mazhabi regiments of the Bengal Native Army (23rd and 32nd Pioneers) one would be tempted very much to limit enlistments in the Hospital Corps to the Sweeper (*Mihtar*) caste, or at any rate to require from each individual native orderly the performance of such duties at the sweeper caste alone would undertake.

To day it is really absurd to see the way caste interferes with the efficient performance of ward duties by the Native Hospital servants. Every Medical officer must have noticed such occurrences which need not here be tabulated. By enlisting the sweeper (*Mihtar*) caste a body of men are secured without any prejudices whatsoever, they will do everything a European orderly will do in the nursing Department, they are a fine race physically, seeing that they eat freely of animal food, and they could on the field and at sea be rationed on European Commissariat supplies. The *Lallbegi* branch of the Mihtar caste is a particularly fine one as regards physique. That they are ignorant is true, but training that has made of the Mazhabi Sikh a most efficient soldier Pioneer can do the same for the Mihtar of Lower India. Such men would come into the Corps to perform at first the humblest cleaning and sweeping functions and it would be a period of probation for them whence the most intelligent could be chosen for promotion to ward duties of a higher class.

However it would be unfair now to cut off the claim the Chumar class have on the state from long hereditary connexion with the Army Hospitals, and doubtless at first the whole existing establishments of the chumars would have to be taken almost *en masse* into the Corps.

But the advantages of a Sweeper (*Mihtar*) caste of men for this duty are very many.

27. I am aware of Surgeon General Beatson's aim to raise the standard of caste in the Corps to as high a pitch as possible, but it never can rise beyond the *Chumar* caste, and if we go so low as Chumars and meet with inefficiency from caste prejudices, it would seem

to be better to take one step further, for it is but a step, and enlist the low caste, but physically strong and willing Mihtar who is wholly without prejudices and can with training be made a most efficient servant.

It is hopeless to imagine that any high caste man of Hindu faith will ever accept such service as this Corps would entail. We can never hope for anything higher than the chumar caste, and it is worth consideration whether tapping a lower social *stratum* such as the Mihtar caste is, would not end eventually in efficiency.

A certain number of Mahomedans will always enter the Corps. They come in principally as water carriers (Bhesties). The Kahars (Doolie bearers) are a Hindu caste. They will always form an important part of the Hospital Transport service, and certain number of them will always be embodied in the Corps in peace time, and trained to act as Sirdars or Head men of divisions of doolie bearers in field service. By training and practise they might be made efficient *Krankenträdgers or removers of wounded men from the field*.

28. *Age* :—Dr. Beatson proposes the age for enlistment as from 18 to 28 years of age. The age question is of importance not so much for entry as for discharge from the service. The men should be thoroughly efficient, and to be so, and to keep them fit for duty with European Corps in the field they should not be retained when worn out and decrepid, which is now so often the case with many native officers and Non-Commissioned Officers in the Native Infantry Regiment. A definite pension after a definite service rarely exceeding 20 years is no doubt what is wanted for them.

29. *Dress* :—To enable the English soldier to recognize who they are, the Native Hospital Corps should be dressed as far as possible like our own Army Hospital Corps in the Imperial Army. In like manner as the Bengal sappers and miners copy the Royal Engineers dress with some modifications, so let the Hospital Corps of India copy the Hospital Corps of England. A blue serge jacket with blue facings piped with red. Blue knickerbuckets, a blue *pugri* with a badge of the Geneva cross pattern in white metal, white belts, Infantry great coat and sword bayonet or pioneers sword will make a suitable dress for the cold season. White or blue calico uniform would be worn in the hot season, and at all times and places the arm badge of the Geneva convention should be on their dress. Uniform is most essential for these men, and should be worn at all times, on duty. To day, without uniform, without any badge to distinguish them from any ordinary natives these men are stopped by sentries, taken up by Military police, now and then assaulted by the soldiers, and are frequently dirty and untidy on duty because they are without uniform. It is a mistake ignoring uniform in the Army Departments. It means order, regularity and discipline and all these things mean efficiency.

In no place is order, cleanliness, and efficiency, more essential than

in an Army Hospital, and making the attendants wear uniform and appear neatly and regularly dressed has a great moral effect upon them. In the field without uniform these unfortunate men would certainly be shot down or bayoneted by mistake as it said many were in 1857-1858. With uniform such disasters could not occur. Again the state gives certain articles of dress yearly to the native soldier and would act doubtless in a similar way by the Hospital Corps orderly to his great benefit, and the certain comfort of all who ever come in personal contact with him.

Uniform then is essential as an aid to efficiency and should be constantly worn when on duty.

30. Training :—Efficiency in a Corps such as all Army Medical officers desire to see organized from the present haphazard system will depend very much on the thorough training the orderlies will receive in their duties.

To secure this efficiency in the Army Hospital service alike in England and India one thing is necessary, namely complete and thorough uniformity of system in every Army Hospital throughout the empire. It is well known that such uniformity does not to-day exist. Under Regimental organization, now abolished, every separate regimental hospital varied in its petty details of organization, and so many different systems of working obtained owing to the ideas of different Medical or Commanding Officers that a medical officer or non-commissioned officer or orderly trained under one system was for a time at sea when ordered for duty in another Hospital. In India where the Hospital organization is more elaborate than at home and where for years the Medical Department has been more completely and departmentally organized than in England, this variation has long existed. The subordinate of the medical Departments in this way have suffered in efficiency, because, liable to move from one Corps to another there was no definite system defining the exact way in which every duty was to be done.

So long as a Regimental Commanding officer was supreme in his little Hospital and was alone responsible for its efficiency, so long, uniformity was impossible, and without uniformity order cannot exist.

31. If the Medical Department is to become efficient it can only do so by a system of rules being laid down so clear, and distinct and unmistakeable that no possible error can occur, and then a medical officer in Aldershot, Halifax, Hongkong or Peshawur can go into a hospital at any of these places to find one system working and one routine followed. Doubtless this routine will paralyze the extraordinary efficiency of some of the officers of the Department but it will level up to uniformity officers who cannot of themselves organize or arrange details. This strict tying down to uniformity will of course not apply to Medical treatments. There each officer must be entirely free to follow his own ideas, no code could define that podophyllin was to be used in liver

disease, but a code can easily define the responsibility of a Medical officer for the custody of stores, the due issue of rations, the roster of duty within the hospital walls and such like things. As in a battalion and in an Army the whole Infantry force shoulder arms in one fashion clearly laid down, so in like manner the interior working of an Army Hospital can be clearly defined by order.

But as no order can say to a Commander you are to fight your battle solely with your heavy guns, or solely by infantry attacks, so likewise no limit can be placed on individual ideas of medical treatment. There the fullest freedom must be allowed. But discipline requires that implicit obedience be given to orders defining certain methods of work. Without that all attempts at improvement are in vain, and intelligent chiefs are unable to drag their followers to a higher standard of efficiency.

32. In training these hospital corps orderlies then, what is required? We shall note the requirements in order.

(A). *A Central training School* at a large military station where a good general hospital can be established.

This is a *sine qua non*. Centralization must take place at first to secure local efficiency afterwards.

Unless there be a central school where men can see a large military Hospital worked in all its fullest completeness it will be hard to carry out their training at petty little hospitals where everything being on a small scale, duties cannot be so well defined or strictly carried out.

Men desirous of joining the Corps might be accepted as probationers at any military station, and posted for duty to the military Hospital there.

After six months of such training, the medical officer should report on them as to whether they would be likely to become efficient in their duties, and if they did promise to be so they could be draughted to the Central Hospital for thorough training. Uniform would not be issued to them during their probation, a turban and badge being sufficient during such service. Lucknow and Meerut are without doubt the stations between which the choice would lie for establishing such a school, and Meerut from its proximity to the strong Punjab Garrisons, and its great advantages in climate would doubtless hold its own in any competition with Lucknow.

At Meerut then a large General Hospital being established the School might be formed where not only the Hospital Corps but many of the Sub Medical Department might be trained.

33. *A special Instructor needed* :—An officer of the Army Medical Department who could speak Hindustani and who had

considerable Indian experience would be needed as Instructor for the corps. He should by plain and simple vernacular lessons explain the various duties required of the men in peace times and in the field:

34. *A book of Instructions* :—A book of instructions written in simple Hindustani (Urdu) pointing out how each duty is to be performed would be needed. It should be written in Hindustani (Urdu) the language which the majority are acquainted with, and should have plenty of plates and pictures of everything that can be so illustrated. To men of little education pictures speak strongly to instructors.

35. *A yearly course Instruction* :—The whole routine of training might be got through as far as lectures and practice parades are concerned in some eight months. The instruction course would thus be got through easily within the year. Say from October to June In this way both the hot and cold weather Hospital routine might be seen.

36. *Assistant Instructors* :—A certain number of warrant officers of the subordinate Medical Department and some old intelligent servants of the Hospital Corps would be needed as assistants to the Chief Instructor. They would carry out their duties under his instructions.

37. *Drill* :—Drill is an important agent in disciplining men. I do not now refer to elaborate movements with fire arms and such like, but a course of setting up drill, extension motions, and learning how to march is useful to all and particularly to a corps like the Hospital Corps. Drill means discipline and unhesitating and ready obedience to words of command, qualities essential in a hospital servant. It would be useful then to have a steady havildar of a Native Infantry Regiment at the training school, who would put these young men through a short drill course.

38. Some officers will think this a waste of time. It is far from being so. It is essential as a training to that discipline and obedience to the orders of superiors without which neither a Hospital nor any other organization can be well conducted. Such a short course would be particularly useful for the junior officials of the subordinate Medical Department and be a great aid to smartness and discipline on their part. The pitching and arranging of a field Hospital in all its various departments should also be made into a drill, every movement being defined and uniform throughout India in manner of packing, pitching and routine.

The removal of wounded men would be also made into a defined drill, the only way to maintain efficiency with natives is to lay down a routine and follow it invariably. The present *Kahars* or doolie bearers should be trained to carry off the wounded. At the central

Hospital, compounders would also be trained, and what is still more requisite there should be a class of men taught cookery for the sick soldier there. To make good soups, puddings, and dainty dishes is very important. To day, hospital cooking is far from being perfect.

39. *Pay* :—The pay question is one of great importance. At present with a great crowd of ill disciplined and untrained men, all more or less poorly paid, the charge against the state is still high because a great crowd of inefficients are kept to do work, which three fourths the number of well trained men would more easily accomplish. It is certain, that with a well trained corps a marked diminution might be made in the number of servants employed ; but the charge against the state would not be lessened, because, to procure good men good pay must be given, and it should be fully equal to that given to the private sepoy in a native corps. The Hospital Corps should in every way be treated as simply another Corps in the native Army as far as regards pay, good conduct pay, pension and claims to medals, gratuities, order of merit, clothing and such like advantages.

It may seem expensive at first to do this, in the end it will be really an economy, good and trusty men who will never desert and to whom dismissal would be the highest punishment, would be secured, and such men would go everywhere the soldier goes, be it Egypt or Candahar or Cabul or Malacca or China.

To day the pay is so poor that the servants can hardly live on it, and it is impossible to compel them to be clean and smart in their dress when they have not enough money to buy clothes.

Whatever their pay is settled at, it should be divided into two parts, one being *pay proper*, which would be theirs at all times, and the other part being *departmental pay* drawn when on hospital duty only, and liable to be cut by their superior officers for any neglect of duty. By having such a system of pay, order and discipline can be enforced by a system of fines, the most easy and fairest way in the end of punishing natives of their class. In like manner as subordinates of the Commissariat Department may be retrenched in part of their *Departmental pay* for any neglect of duty, so likewise should these Hospital Corps men be dealt with. Another advantage of a fine system is the power that it gives of having the punishment remitted in case of a superior officer considering the punishment excessive. All such fines would be inflicted by the senior medical officer of the Garrison Hospital and entered in the defaulter sheet of the man who should have an appeal either to the military Commander on the spot, or to the Principal Medical officer of the district, as may be decided on. A number of petty neglects, occur in hospital routine, apparently small in themselves, and impossible to be dealt with in any way save by petty fines.

These men should be paid as at present by the senior Medical officer with whom they are serving, either the Apothecary or the Pur-

veyor drawing up the pay sheets and keeping the accounts. Good conduct pay, compensation for clothing, compensation for dearness of provisions and all such claims would be dealt with in the same manner.

40. Discipline :—At present there is little or no check upon the crowd of Hospital servants.

Not being enlisted, it is impossible to punish them by imprisonment under the military act, and an illegal system of fines is with dismissal, the only disciplinary measure available for their control. At once on enlistment all this would cease. They would become amenable to a number of disciplinary measures, but the method now most in vogue for punishing them would become wholly illegal. Except for drunkenness no soldier can be fined in a direct manner, although practically it is done by depriving them of their good conduct pay. If the Hospital servants are ever embodied, I think the line system should be legalized and it can be done in this way. Let a portion of their monthly pay say 1-6th be departmental pay or employed pay, drawn only when on duty and let it be available for being cut by their departmental superior officers. To be able to fine such a servant even a few annas is a most important measure, and one very essential even in the Imperial Army Hospital Corps, where defaulter's drill, or confinement to Barracks would be dangerous to the health of a hospital orderly, already weary and fatigued with the depressing work of a sick ward. By fining such a man punishment is given, and no injury done, and indeed it seems to be a punitive measure still quite in its infancy in the service in every department. The more the pay of the soldier is increased the more easy it will be to fine him for misdemeanours now punished in other ways. This fining power in the case of the native Hospital Corps should be in the hands of the senior Medical officer of each hospital, and no one else, and all such fines should be entered in the defaulter's sheet as in the case of every soldier. Courts Martial and such like severe measures need only be resorted to in cases of grave misdemeanours.

The power of dismissal from the corps for ignorance of duty or unsuitableness for hospital work should also be reserved to the authorities or to a committee.

41. Dr. Beatson would seem much in favour of making the European Hospital Sergeant the responsible subordinate for dealing with the native servants.

I am opposed to such a view of the case and for these reasons. The Hospital Sergeant is a European, he may have just arrived in India, he is constantly ignorant of the language, quite unable to understand the prejudices and the customs of a totally different people from himself, and which take time and experience to learn. It would lead to constant friction between the warrant Medical officers and the sergeants if the latter who have nothing whatever to do with the servants were to be in charge of the discipline of those servants, and the former to be daily

and hourly in contact with the servants, but have no authority over them. The Warrant officers of the Subordinate Medical Service have full military authority over the Hospital Sergeant himself, and can place him in arrest at any time for neglect of hospital duty. It is to these men, knowing the natives, full of Indian experience, and generally fairly efficient that I would hand over the authority over the hospital servants under the Medical officers.

All kit inspections, parades and training parades should take place under these men and these can easily do it. Indeed, I think nothing but good results can come from giving the Subordinate Medical Department more work to do. The Senior Apothecary of the Hospital should keep all their documents and be under the Senior Medical Officer, the responsible person for their regularity and efficiency. This localization of responsibility is the true principle, and the more it is followed at home and abroad, the nearer will complete efficiency of the Medical Service be approached.

42. Promotions :—Promotions should take place on recommendations forwarded by the Local Medical Officers to the central authority of the Corps, at Meerut or elsewhere. Examinations can test efficiency to a certain extent and an intelligent man will soon work his way to the front. The book of instructions written in Hindustani should contain all a man needed to know in a hospital and any examination should be based on it. In this book there should be placed a vocabulary of English words say 100 to 200 words in common use. It is quite astonishing how many English words natives seem to know when one overhears them talking to the private soldiers, and by having a book or vocabulary this knowledge would be much increased. Knowledge of English would be a claim for promotion, and in the short service garrisons of the future would be found to be a great comfort.

Nothing further remains to be dealt with in the limits of this paper. The Medical Service can but point out the necessity for improvements. It rests with others to act on these suggestions. Every officer of the Army Medical Department would hail the institution of this corps as a real boon to himself personally, and what is still more important to us all, as a downright comfort and blessing to the sick English Soldier in India. Efficiency in our hospital has always been our aim, although perhaps not always in our grasp. This corps would be one step more in that direction.

With such men bound to us, by the ties of a common duty to the sick soldier, no work would be too arduous, nor any labour too excessive. But to ask us to work well, and not give us the materials with which to do good work, is the policy of Pharaoh and not of to-day.

It may be somewhat costly, and in the annual estimates people

will point out how heavy a charge the Medical Service has become; one word silences all such remarks. It is I trust the aim we all pursue, and that is "efficiency."

GEORGE. T. H. EVATT, M. D., SURGEON MAJOR,

Army Medical Department.

FYZABAD, OUDH.

April 1877.

III.

THE CAUSE OF DRUNKENNESS IN OUR ARMY AND THE
BEST MODE OF SUPPRESSING IT.

ESSAY BY SURGEON MAJOR T. H. EVATT, ARMY MEDICAL DEPARTMENT.

SECTION I.—INTRODUCTORY.

1. We propose, in the paragraphs that follow, to enquire into the cause of drunkenness in our English army, and the best mode of suppressing it. In an enquiry such as this, which is directed to the investigation of our inner army life, all false theories of "Esprit de Corps," and all glossing over of painful or unpleasant facts, must be put aside, and plain unvarnished truth, whether good or bad, be openly stated for public comment and criticism.

We do not believe it possible that any individual in the service, who has given this most important subject the attention it deserves, can deny that in our army, a very marked amount of intemperance does exist, and that the safety of the state, the efficiency of the armed force of the country, and the personal fitness of the soldier is much imperilled by this terrible blot. Nothing but its constant and continued existence for a very long series of years, and the dangerous theory that it must always unavoidably pursue the soldiers' life, renders us so tolerant as we are of this vice of drunkenness, one of the most deadly crimes which a fighting man can be guilty of.

2. Our military history shews us that this curse of our service has often, in by-gone days, tarnished the glory of our days of victory and our hours of triumph, that in the moment of danger and suspense, discipline and soldierly order have perished before its baneful power, and that it has sullied our fair fame with the reputation of being the most intemperate military organization in Europe.

During the long peace, and during our campaigns made in countries where alcoholic excesses were impossible, owing to the absence of liquor, we have forgotten the dismal tradition of our Peninsular experiences, but every thoughtful soldier must even now, look forward with dread to the day when duty again calls upon our army to campaign in the wine countries of Europe, a dread based upon a knowledge of the past, and the fact that the drinking habits of the army have changed but little amidst the reforms of modern days.

But if evils have arisen, and may again arise from this weak point of our soldiers during the rare occurrences of campaigns and the fatigues they entail, who can pourtray in any suitable words that enormous amount of misery, of suffering, and of crime, which during peace time

has from this single cause alone hung like a dark cloud over the barrack life of the soldier, has dimmed its enjoyments, and been literally the sole cause of all his troubles and distresses. A history more painful, or more full of sad and sorrowful episodes, it would be impossible to conceive, and to this single cause alone, we may attribute ninety-nine-hundredths of the misdemeanours of the soldiery. This one cause of trouble removed, crime would sink into nothingness in the service, and the soldiers' life lose the greatest source of its hardships.

3. In the dark and bad days, so wrongly called "the good old times," theories the most dangerous and destructive to soldierly efficiency prevailed in our service, and indeed still linger in the public opinion of the barrack-room.

Manliness, courage and true soldierly bearing were all bound up with this fatal habit, and a man who did not drink found himself liable to be laughed at as a milksop, and as unworthy of a soldiers' name. In such days as these, every class of society drank deeply, and the same theories that now linger in the ignorant minds of the lowest classes of the kingdom, then found an echo at the table of the Prince, and in the assemblies of the best classes. The then army life merely reflected the life of every one outside its ranks, and little blame could be attached to it alone that every class of society would not share. But since these by-gone days, the opinion of society has undergone a most marked change, and the dogmas of the regency age are now exploded altogether, in the light of modern knowledge, in the upper and middle classes of the kingdom.

We have discovered how false many of the then existing theories were, and society has remodelled itself on a more temperate basis. Drunkenness is looked upon, not as the harmless amusement of a gentleman, but as a disgraceful and unpardonable offence against good taste, and its existence amongst educated people attracts special notice where, in the olden days, it passed unregarded. The middle class and the working classes share in the temperance ideas to a great degree, and teetotal principles are making rapid strides amongst them. But in the lower strata of society, public opinion still looks lightly on drunkenness and too often condones it.

4. Now the army, with its strong conservative tendency and its self-contained life, during the long peace, shared far less than outer society in the spread of temperance ideas, and although amongst the officer class drunkenness disappeared as a habit once quite common, still, in the traditions of the service, in its public opinion, and in the daily routine of barrack life, drunkenness held much sway, and was lightly looked upon, the temperance man was an exception, and temperance theories looked upon as idle dreams. Suffering and misfortune have been the bitter fruit of such ideas, but a better day has now arrived. The army is awake to its weakness, great efforts are being made to

stay this devouring evil, and there is no question that it has been more or less checked. But a great amount still exists to disturb the repose of inner regimental life, and the personal happiness of the soldier.

5. We hope however for the best in the future, and we have good grounds for that hope. It cannot be too well borne in mind, that this reform in the drinking habits of the army which we aim at, is essentially a *personal* reform. It is true that the superior authorities of the service can remove every seeming encouragement to drink, and every possible excuse for drunkenness, but still the real effort must be made by the man himself.

Other army reforms are made by the pen of a War Minister, or the orders of the Chief Commander. It is not so here, the labour falls on the shoulder of the individual himself, and hence its difficulty in achievement.

It is but the first step that costs, but how much that first step means.

6. In the paragraphs which follow, it shall be our aim to point out the duties alike of the state, and of the individual, in achieving the end we have in view in checking this intemperance, but after all, the individual is the most responsible party.

We can never hope for any real success in an enquiry of this kind, without seeking out the causes of the evil and plainly stating them. This is an essentially English proceeding. No nation has been so thoroughly distinguished for uncompromising love of knowing real facts about ourselves, as our own land has been. For us no false and lying bulletins have ever found favor, and the truth, the bitterest truth, has in the end been our sweetest and best food. That which places us to-day in our proud position as the foremost race in the world, is the knowledge that whatever our shortcomings are, we know them best ourselves, and we can never be hoodwinked and deceived as other peoples have been.

So let it be here. Let us boldly lay open the wound, and learn the worst, that once known the remedy can soon be discovered, and the cure effected. To deceive ourselves with false and rose coloured statements is terribly shortsighted, and we deceive those who should really know the worst, and that is we deceive ourselves.

We shall consider first what we deem the causes of army intemperance, and in a separate section the remedies which we think would tend to check it.

SECTION II.—THE CAUSE OF DRUNKENNESS IN THE ARMY.

7. We believe that under the eight heads that follow below we can group very many if not all the prominent causes of army drunkenness. They are as follows:—

- I.—Many of our recruits were drunkards before enlistment.
- II.—Objectionable Canteen rules, Beer and Rum allowances.
Issue of Rum after marches or fatigues, or Beer after cricket or theatricals.
- III.—Long service. Tedium of life. Absence of interest or change.
IDLENESS.
- IV.—Absence of higher educational arrangements, and good schools.
- V.—Absence of change in diet, or deficiency of nourishing food.
- VI.—Fanciful climatic and medical theories, encouraging drinking.
- VII.—Breaking to the ranks direct from the grade of Sergeant.
- VIII.—Barrack-room chaff, and absurd theories of "Esprit de Corps."

I.—First Cause.—MANY OF OUR RECRUITS WERE DRUNKARDS.

BEFORE ENLISTMENT.

8. That many of our recruits had already before enlisting contracted drinking habits no one can deny. We need not now enquire into the reasons which have existed why our army should be so composed, but the undeniable fact does exist. The English service presents this feature in a more marked degree than any other in Europe, viz. that the officers belong to the better classes, and the men, with hardly an exception to the very humblest in the social scale; the middle class, which represents so thoroughly many of the best points of the English character, is wholly unrepresented, and although very rapid reforms have taken place during the past few years, the day has not yet arrived when young men of that class, who form the bulk of the Continental armies, can see any future open to them in enlisting in our service. The conscription, which draws into a single barrack room, and places in every day and most intimate contact, every grade of Continental society, and, whatever its drawbacks, tends more than anything else to weld a nation into a homogenous mass, has no counterpart in our institutions. The influence which contact with gentlemen imperceptibly exerts on the peasant boy, is wholly wanting with us. Our barrack rooms are filled with a single class of men, and that class often the least educated and least morally disposed of the nation.

9. The opinions that prevail, and errors that reign there with undisputed sway, are the result of the ignorance of our humblest classes, and the light and knowledge which conscripts of the better class would bring with them is never seen or heard there. Emigration, wonderful commercial activity, and unrivalled manufactures offer so many attractions to the better part of the lower classes, that to-day we are getting

merely the least objectionable men we can find. The Gin Palace is still unfortunately the great centre of our recruiting service, and "Sergeant Kite all ribbons and lies" in the parlour of the Public House tries to secure even what indifferent material we do get as soldiers. Such recruits, broken down by excesses, or living on the verge of starvation for some time, exposed to the inclemency of an English climate, and often without education or good teaching before joining, have already learned to drown their sorrows in liquor, and indeed but too often the whole enlistment is the result of a drunken fit. These men have not been made drunkards in the service, and for them at least no army rules are to blame. It is amongst them that the greatest efforts should be made to develope temperance principles, and it is for their sake that whatever army customs now exist, tending to foster drinking habits, should be modified or abolished to assist in preserving them from temptation.

Hereafter, in dealing with the means of suppressing drunkenness, we shall have again to notice this subject of the character of the men enlisted into the army.

II.—*Second Cause.—CANTEEN RULES, BEER AND RUM ALLOWANCES.*

ISSUES OF LIQUOR AFTER GAMES AND SPORTS OR, FATIGUES.

We believe that many young men, who would not think of tasting liquor, are led on to do so by some of our Canteen Rules. Very many young soldiers before entering the army taste nothing but beer; often of a weak quality. Spirit drinking is essentially a vice of cities and perhaps of the Scottish peasantry.

It has never had any hold on the English rural population. Now the moment a man arrives in this country, and 60,000 English soldiers serve in this Indian Empire, he finds a Beer and Rum allowance detailed for him. He buys it, it is true, and need not do so unless he pleases, but unfortunately few men refuse the opportunity afforded them in this particular.

The public opinion of the barrack room, which is often laid down by the old soldiers, is in favor of the allowance of Beer and Rum, and a young recruit soon learns to sail with the stream. Custom, a terrible tyrant, soon exerts her sway, and the lad, who never tasted Rum until he arrived in the country, soon takes his allowance daily, and misses it if he does not.

The Rubicon has been crossed, and his further career towards drunkenness is too often the result. Many Officers of the older school encourage the issue of Rum after a march, after fatigues, or any duty off the common. Every such issue weakens the resolve of the recruit to avoid drink. He sees it issued to his comrades, thinks it is essential to his well being, finds it suits his taste, and he drinks.

Our men have learnt to look for Beer or Rum issues after every unusual event, and we think a stand should be made against this idea. Beer issues after cricket, Rum issues to Bandsmen after playing at mess, or after theatricals, are all part of the same system, and all tend in a degree to weaken non-drinking principles.

Slowly with the progress of modern ideas, the quantity of the Government liquor issue has been reduced by one-half and Beer has been more generally made available for the troops, but we think it wrong to have any defined quantity laid down, and conceive that a perfectly free beer canteen would in the end be a truer and safer principle to stand up for. In such a canteen doubtless at first there would be much drunkenness, but such things soon find their level, and in the end we should have no more drunkenness than at present, and have no quantity laid down. The first draft of recruits that arrived in the Country would then escape the temptation that the now existing rule gives to them to drink, and we think a step would be made in the right direction.

Abolish the rum ration or not, there is no question that soldiers urge the fact of the defined allowance as an excuse for drinking it, and say if the Government thought it wrong for us to use it they would not issue it. The soldier too is in constant fear lest the Government should ever get the better of him in any bargain, and he thinks he might lose in some way if he did not draw his allowance.

Few institutions in a regiment may become so terribly dangerous to discipline and order as the Canteen. Deception and fraud were until lately invariably connected with its management, and it still remains a question if much injury is not done to the *morale* of the non-commissioned ranks of the army by allowing them to figure in the role of a tavern-keeper for certain periods. Such a position for men responsible for the order and discipline of the soldier is, we think, a false one, and should be abolished. Commissariat subordinates should discharge this duty. It is impossible also for complaints on the quality of the liquors sold, to reach the officers' ears, because all the N. C. O's are interested in suppressing complaints, as they may one day have charge of the Canteen themselves.

III.—*Third Cause.—LONG SERVICE. Tedium OF LIFE. ABSENCE OF INTEREST OR CHANGE. IDLENESS.*

All who note the gradual transformation taking place in our army observe that long service, for the Infantry soldier at any rate, has had its day and is becoming a thing of the past. The Infantry, forming as they do the great mass of the army, will be returned to civil life in a period always under six years from their date of enlistment, and viewing the matter even apart from its great value as leading to the formation of a reserve force, we think the army will in a moral sense be a gainer by the innovation. With whatever romance the outer world has decked the soldiers' life, it little knows how ruinous and how weary-

ing a tedium broods over the life of the fully trained Infantry soldier, when, having learned his drill, got through some lessons of reading and writing and mastered enough knowledge to sign his acquittance roll, he becomes "the duty man." Poetry and prose have been exhausted to throw a glamour over the soldiers' life, but every day modern requirements and changes are driving that glamour far away.

The average life of the soldiers, unless when full as it is of intense excitement during the rare occurrence of a campaign, is really very dull.

The absence of home pleasures, the non-existence of family cares, to divert with their sweet anxieties the routine of every day life, the absence of all visible result from weary hours of monotonous parades and days of manœuvring, and the extraordinary sameness of barrack life have a depressing effect upon the soldiers' mind.

The enthusiasm and the zeal which is developed in the civil trades man who sees growing up under his hand the gigantic ship, the noble edifice, or the beautiful fabric, an enthusiasm which supports through long days of toil, can have but little existence in a soldiers' mind who performs the same routine in the spring drill of his 18th year of service, as when a young recruit he learned his first movements on the Depôt barrack square.

It is true that no soldier of any existing army sees more of the world, passes through more exciting localities or more wonderful places than ours does, yet so little has his mind been awakened by the lights of education, that it is astonishing how seemingly asleep he moves through life. Canada, the West Indies, the Mediterranean, the Cape and India unfold for him a thousand varying interests, yet all who know the soldier best, who have sounded his mind and elicited his ideas, will be astounded at the stolidity which chains up his understanding. He rarely appreciates the wonders he is placed amidst, and his mind, that might with due educational efforts be awakened to perceive beauty around him, too often sleeps.

Cantonment and Fortress life is monotonously dull for him, and station after station is gone through with little effect upon him.

How different it is with the English Officer. Well educated, able to understand the varied peoples which he more than any Englishmen is thrown in contact with, able to get leave and satisfy his curiosity by travel and escape the tedium of a cantonment, the society of agreeable women and cultivated men at his disposal, and with a mental culture often very wide in its grasp, the English military officer is probably the most broad minded, enlightened, and liberal thinking military leader in the world, and if deficient in that higher culture which the German officer lays claim to, he is by comparison with those narrow minded and highly prejudiced beings, infinitely more the true

man, far and away his superior in grasp of mind, knowledge of the world and varied experience of life and society.

For the private soldier it is quite the reverse and, alike in Peshawur or Halifax, his aims and his thoughts are too often of the narrowest and most personal character.

With men such as these, wearied by monotony and ignorant of education, *ennui* exerts a tremendous power. To kill that enemy one means at any rate is open to them, and too often it is drink.

Man must be pleased or interested in life in something; if we do not give to him higher aims and more exciting ideas, he will find in the brutal resource of the rum bottle, an easy refuge from his dull life.

As we shall shew further on, he in the latter portion of the 19th century, is going through the same career which 80 years ago made even the English country gentleman often a heavy drinker, because, leading a very monotonous and localized country life, he fell back on wine for amusement and relaxation.

Doubtless the life of the cavalry and artillery soldier is fuller, more interesting, and more liable to waken up the intelligence of the man, than the infantry career is.

The care of his horse, the addition of foot and mounted drills and in the artillery, the rudimentary knowledge of gun theories, all have tended to make the average trooper or gunner a more intelligent man than the average infantry soldier, and for such men long service has less dangers because they have less idleness, more interesting work, and are perhaps in the first instance men of more intelligence and education.

The progressive soldiers of France at any rate have branded the old soldier with undignified epithets, and torn from him the crown that 30 years ago every military system except the Prussian agreed to place upon his brow.

They have termed them "*groggnards*" the growlers, the drunkards, the bad influence of the army, and in Germany we know that, save in parts of the cavalry and artillery, men of even five years service are never seen. With us the term "*old Soldier*" is not an honored one and is too often synonymous with broken down constitutions and habits of drunkenness.

If we can then, in exchange for long service men, get younger soldiers who will master their drill thoroughly, and be returned to civil life before the enthusiasm of youth is killed by the monotony of barrack life, we shall be gainers.

We accuse long service as the fosterer of drunkenness, because a man, once trained in his duties, living a life devoid of interest without

wife or child to waken a new soul in him, thinking solely of himself and his gratifications, executing for long years monotonous and uninteresting parades, and rarely educated up to an easy reading standard, often falls back for amusement, for resource, and to while away the time on the most brutal means of driving away ennui and that is drink.

IV.—Fourth Cause.—ABSENCE OF HIGHER EDUCATIONAL ARRANGEMENTS, AND GOOD SCHOOLS.

We believe that men drink very often through mere idleness, and to kill ennui. Whatever tends to enlarge a man's capabilities for amusement, whatever opens to him new fields of mental or physical enjoyment, has then a good effect. The State has in most barracks provided libraries and recreation rooms for the soldier, but we maintain that the State might as well have provided the most beautiful pictures for a blind asylum, as books for those who cannot read.

Any one looking over the acquittance roll of a company, and seeing the extraordinary efforts of penmanship called signature attached to it, could not form a high idea of the education of the men. It is true much has been done in the way of education, and something is doing, but the State is still far behind hand in its duties in not carrying to a far higher degree, the mental training of her soldiers. It is an easy thing to provide libraries but it is a hard thing to teach men ; to carry illiterate and heavy headed peasant boys over the Rubicon of fluent reading and good writing to teach them Geography and History, to let them learn of the country they serve, and whose soldiers they are. To do this, is hard ; it means constant and continued labours, but to provide a library, which may not be used, is an easy thing.

We believe that the education of the army is not sufficiently provided for, by placing in a Battalion of 800 men, a Non-commissioned School Master who is virtually independent, and giving him a private soldier as an assistant.

Every institution in a regiment, down to the canteen, is presided over by Officers, often two or three, but here the school, the wellspring of education, of order, of progress, of true discipline, and of every thing bound up to-day with the term soldier, is virtually independent, for the company officers never visit it to inquire into its inner conditions, and the Adjutant and Commanding Officer rarely do so. An annual inspection is not sufficient to keep the School Master up to the mark, and we have ourselves often found fault with the internal working of the system.

Men pass examinations of a very mild character, but education, in the true sense of the term, is still very distant from them.

They cannot read a newspaper or a book with comfort, and unless they can do so, libraries are quite thrown away

But now a days, if we are to stand as a military power, we must educate our men.

Drawn as they are from a very ill informed section of society, they require treble the teaching and trouble a conscript soldiery need, to make them grasp their profession. It is in vain to cling to the past ideal of an English soldier, once perhaps the best drilled and most machine-minded soldier in Europe. To-day such a man is useless, and more than useless, he is an active danger. If Germans, Austrians and Frenchmen teach their conscript soldiery, often educated men, what labour shall we not expend on our coarser material ?

The school should be the best opponent of the canteen. It should oppose it, by wakening up the dormant mind of the peasant lad to the highest walks of education, and continue its course, as the drill is to-day continued, during the whole of the man's service. Occupation of mind is a great thing, and in the school more than anywhere else, it can be obtained.

If we are to have any long service soldiers they should never be excused attendance all their service, but to so employ them needs high teaching and good teachers.

Men who cannot read fluently are shut off from a pastime which is the chief recreation of educated men all over the world, and if they are shut off from this pastime, there remains open to them few recreations, and drink, that at least passes away the time, has a greater charm for them than it should have.

V.—*Fifth Cause.—ABSENCE OF CHANGE OF DIET, OR DEFICIENCY OF NOURISHING FOOD.*

Men may be led to drink, because at certain seasons they do not care for their barrack rations, and cannot secure any change. We all know how much the better classes are in this way superior to the soldier, having frequent changes of dishes; dainty tempting food, afternoon tea, early morning tea, and iced drinks, all enabling them to battle with any feeling of depression which at times seems to attack many people. A great monotony seems to be the drawback of the regulation ration, and every attempt to vary it should meet with encouragement.

Good cooking, which is second only to good rations, is also a want amongst our men, who are probably less skilled in the mysteries of the cook-house than any body of soldiery in existence.

Variety will always be a difficult thing to secure in a soldier's ration, but in directing attention to the bearing of the ration question upon drunkenness, we desire that all encouragement may be afforded to securing well-cooked good rations. A delicately organized man, who

cannot digest his ration, finds himself hungry after his meals, and failing in securing some food, falls back on liquor to check the demand of his system for support.

VI.—Sixth Cause.—FANCIFUL CLIMATIC AND MEDICAL THEORIES ENCOURAGING DRINKING.

Many people would be surprised to know how long ancient theories, which have for years been exploded in the minds of the cultured classes, linger in those of the ignorant : ages indeed are hardly long enough for the spread of truth around the world. To-day there lingers in the barrack-room, as in the homes of the more untaught classes at home, many most erroneous theories on the value of liquor in sustaining life or standing exposure.

It is astonishing too how strongly we support any theory with which our own personal tastes are bound up. Thus into the ear of the young recruit, the more experienced "old soldier" may pour out a tale of the necessity of drinking in India, of the impossibility of existing without strong drinks, of what this officer said and that Doctor thought on the subject, and, especially, that the Government had placed a supply of malt and spirit liquors ready for use in the canteen close by. Such theories act most prejudicially on the minds of the young soldiers, and assist powerfully in shaking any temperance views he may have had.

In the better taught classes such theories are every day being driven away. We know from experience that non-intoxicating drinks are far the best for use in these climates, that in tea, lemonade, tonic water, and such like things we have far safer beverages than any liquor however mild.

All medical men agree in the danger of spirituous drinks, and every day an increasing portion are becoming still more advanced in a teetotal direction, and refuse to administer or order these agents, except as valuable and useful medicines.

Such views as these however are rarely heard in the barrack-room, and we regard it as the foremost use of temperance societies, and publications, that they bring within hearing of the soldier, and easily within his reach, the opinions of the best men on these subjects. The prejudice and ignorance of the men is being daily assaulted, the reason *why* and *because* is explained to them on the drinking question, and weak men, trembling for support receive it, and are supported in teetotal views which are often unpopular, and render men liable to chaff. The teetotal party have nothing to fear from enquiry. The more the cause is looked into the more strong it becomes.

VII.—Seventh Cause.—BREAKING SERGEANTS FROM THAT RANK DIRECT TO THAT OF PRIVATE SOLDIER.

The very condign punishment of breaking a sergeant direct from his important post to that of a private sentinel, often for a single mili-

tary fault, has a very bad effect upon the sufferer who often in consequence becomes disheartened, and seeing in a moment the result of long years lost to him, may become a confirmed ne'er do well, and drown his regrets in drink. There are few branches of public or private employment where so sudden and complete a punishment is inflicted on offenders. We have ourselves known in a single Battalion, 50 men thus broken doing sentry-go, and as many as eight (8) of these in a single company.

The evil effect of such a condition tends to weaken the prestige of the sergeant's grade, and fills the barrack-room with men who know the inner life of the sergeant's mess, an institution often liable to blame in encouraging excessive drinking.

By reducing a sergeant to the bottom of his rank, or to that of corporal, a gradual scale of punishment might be adopted ; and a man would get the chance of reforming without being at once reduced to the ranks.

For sergeants, as well as for the men, school instruction and higher mental training to occupy their time, elevate their intelligence, and to counteract drinking tendencies, are much required.

VIII.—*Eighth Cause.—BARRACK-ROOM CHAFF AND ABSURD THEORIES OF ESPRIT DE CORPS.*

The public opinion of the barrack-room is still unfavorable to water drinking theories. Chaff and banter, a great power with young recruits, is still the defender of drinking for soldiers, and young men who dread to be peculiar, yield to that public opinion and drink. A false theory of efficiency as a soldier, and absurd notions of Esprit de Corps combine with the claims of hospitality, to prevent a man drinking water. A moments thought is sufficient to prove that, as regards efficiency, a water drinker is more soldierly than a spirit drinker. The fewer wants the soldier has, the less encumbrance he is to the Supply department, the more easily he is fed and rationed, and the nearer he stands to a state of nature.

If he drinks water every land can supply him, he need never feel a want he cannot supply, good temper, better digestion, and as a rule, higher physical power will be his, more so than of the man who drinks. The English army has never been in a better working condition, been more happy, and had less crime, than when accident having cut off liquor supplies, the men have had to fall back on water. Alike in the heat of the tropics, or in the frozen seas of the north, when enduring long marches, or when confined in a beleaguered fortress, whether exposed to the violent storms of an Atlantic winter, or the tremendous exertions of the great iron foundry factories, Englishmen have borne all these varied labours more easily, and been better men when drinking non-intoxicating liquors than when drinking spirits. Good Commanders, experienced physicians, travellers who have penetrated every nook of

the world, and a crowd of philanthropists and social philosophers have testified again and again in favor of temperance, and against the vice that brings ruin to a thousand homes, but the day has not yet arrived for the ideas to have penetrated to the humbler classes, and drinking habits are still supported by the public opinion of the lower strata in the social structure.

Esprit de Corps, a noble thing when exerted in a rightful cause, has often done good to a man, and supported him amid difficulties and dangers, but when so noble a principle is degraded to the support of rum and brandy it has fallen tremendously. Lord Clyde once said "*Hang Esprit de Corps, give me discipline*," and in truth, if *Esprit de Corps* were exerted in favor of liquor, we heartily agree with him.

SECTION III.

THE BEST MODE OF SUPPRESSING DRUNKENNESS IN THE ARMY.

INTRODUCTION.—It is a truth, which is every day becoming more impressed upon society, that human nature, in whatever grade or class we examine it, is wondrously similar. Whatever wants the rich man has, the poor man likewise feels in a degree varying with personal ideas or tastes. There are no special feelings or tastes limited to any one special class of society. In a thousand individuals, of whatever position, a wonderful average of sentiment and ideas will be found. In truth, mankind is very human. Thus the taste for sporting, the love of athletic sports, a taste for reading, the enjoyment of pictures, a love of retirement and solitude or the reverse, prevail alike in peer or peasant.

Society did not always think so, and in days now past by, it was a theory that set and special good or bad qualities were limited to set and special classes; narrower ideas filled the heart of every trade or occupation, and petty jealousies were fostered by these theories. To-day they are passing away before the bright light of modern thought, and linger only in the more conservative organizations.

In no society was this theory more strongly upheld than in the English army. Living a life often in lonely stations, scattered over a great Empire, and full of high ideas of its own excellence and importance, it was often said that soldiers were a group apart, understood only by soldiers, not to be measured by ordinary civil standards, leading a wholly different existence, and in fact a class of themselves, whatever general principles applied to other professions or callings, these principles did not extend to the soldier class, and all enquiry by the outer world should stop at the barrack gate.

We know very thoroughly that this theory is false, and that there is no general principle that applies, as a host of principles do, to every occupation, that does not likewise apply to the military service. There is no mystery in it, nothing that the educated mind of society may not

investigate and criticise without fear. We know that if the soldier is not fed he will fall off in strength, if not clothed he will catch cold and disease, if not lodged well, he will suffer as any peasant suffers, if over-worked, he will tire and break down, if instructed highly, he will become intelligent, and if idle he will suffer from tedium of life, and will secure for himself distraction from it by the readiest method.

Ennui is no more the special privilege of the boudoir of the wearied follower of fashion than of any other place, and it may reign with sovereign sway in the crowded barrack-room. We have written thus much in generalities, because we think it bears very much on a question we would ask, and that is, why society to-day in the better classes is less drunken than it was in the Regency times? Why has it come to be looked upon as disgraceful to get drunk at a dinner table to-day, when 60 years ago, and even later, it was quite the rule?

It is by following up such an enquiry we can obtain a guide as to the means of checking army drunkenness.

Society is sober to-day, and it is a disgrace to be drunk, because during the past sixty years an immense improvement has taken place in every day existence.

Life is fuller, more varied, more interesting, more full of charm and change; travelling is brought within the reach of every grade; the telegraph, the press, and the infinitely higher average of general culture have, in the better classes, opened up a thousand new fields of thought. Every style of mind can now-a-days find subjects to interest it, few of which existed 70 years ago, when men had to fall back on wine to kill the time.

Think how different the type of the country gentleman of 1875, and how different the life he leads, when compared to the life of the same class in 1795; life is for the present man infinitely fuller in the best sense, travelling, books, general culture, and an enormous widening of mind has destroyed for him the tedium of country life as it was 80 years ago, and now we find in the remotest corners of the land as highly cultured men, as fully abreast of modern thought, as in the most cultivated circles of the metropolis. Culture and education have taken the place of the old wine excesses, heavy drinkers of port are mere survivals, and a drunken man of the old fashionable type would to-day be scouted from society.

The lesson is full of interest for the soldier, and the army, as it is for the lower classes of the land.

Until the life of the soldier is made fuller, wider in its grasp, more cultured, more put in accordance with modern theories, and until we follow closely the progress society has made in the best sets, so long will the soldier find relief from his narrow life and the tedium of the

service by the coarse and brutal process of stupefying his brain by strong drinks. This ceaseless ever-toiling engine must get work to do suitable to its bent and inclination, or it must have its busy wheels clogged and jammed by rum or brandy. By such rugged means the man finds repose, whereas varied mental paths should be opened up to him to advance upon.

We must at all cost assimilate the condition of the soldier now-a-days as much as possible to the condition of the better classes, and if this is done alike by mental and physical processes, his drunkenness will receive a great blow, and he will become in every way a better man and a truer soldier. This means trouble and labor but it means also progress and advancement.

We have taught the army the theory of dying for their country, we must preach the infinitely more difficult, more wearisome and less exciting doctrine of living for her. To live to make England happier and better in the good life of her sons, and to elevate her position in the best sense, by driving away the ignorance and the excesses of her children. Any man can die for his country, but to live for her is trouble and labor, and requires far more patriotism and devotion.

Following up the principles we have sketched out in these paragraphs, we shall now enquire under separate headings into some means we think likely to check intemperance in the service—and the various methods we shall tabulate as in the following statement:—

I.—Short service, and return to civil life.

II.—Fuller and higher class education in general subjects in the army schools.

III.—Free canteens, and abolition of all issues of liquor after fatigues or duties.

IV.—Total abstinence societies, and bands of hope.

V.—Good food, and change of diet.

VI.—Soda-water machines, ice machines.

VII.—Diffusion by pamphlets and books of true ideas of the use and value of alcoholic liquors.

VIII.—Encouragement of teetotal principles by the officers of the army.

IX.—By acting on the religious enthusiasm of the men.

We shall notice these subjects separately.

I. *First Aid.—SHORT SERVICE AND RETURN TO CIVIL LIFE.*

We have already in the first section of this paper, accused our long service system of military service as one fostering intemperate habits. We have stated that a soldiers' life when once he has learned his drill is far more tedious, less interesting, and more liable to weariness than any other occupation we know of. This tedium of life arises from the uninteresting and monotonous nature of the work done, as also from defects in our military system in not wakening up more thoroughly the dormant intelligence of the soldiers. No military system in Europe has attended more carefully to the weary routine of drill, and none that we are acquainted with, has done less to waken up intelligence.

In the present day, drill occupies a far less important position than it ever did before, and education and mental training have risen in proportion.

We believe that soldiering for long years has an inherent weariness and sameness in it, which it is difficult to divest it of. Guard duty, parades and routine duties afford so little to interest a man, there is so little visible outcome for so much fatigue, that soldiering as a trade will always be devoid of that continued enthusiasm which supports a workman who sees the results of his labors in a visible form during a whole lifetime. In our Army at present, we dwell so much on barrack square parades, and unchanging routine of mechanical movements; that the tedium which in any military organization is always considerable, is with us excessive. Sir Garnet Wolseley at page 43 of his most excellent Hand-book for soldiers says; "What really fatigues and disgusts soldiers is the time dawdled away in parades."

And again "As for drill, the worst Militia regiment can do enough for all practical purposes." Yet from years end to years end we continue the same dull routine. Soldiers are deeply interested in little manœuvres, field day exercises, forming encampments, entrenching, making bridges, fortifying posts, and such like, but we never see them practised at such things.

Unless we introduce the practise of such things our men will be not only ignorant in the field but even the short service soldiers will complain of *ennui*. Would it not be better to deal fully with this question, and to enter fully into the modern spirit in carrying out the training of the men.

Everything is to be gained by doing so, and nothing can possibly be lost. Every grade in the service would be happier and ennui would be reduced to a *minimum*.

We want a system that will pass the private men through the ranks rapidly, straining as it were out of the mass, such good men only as shew signs of making good Non-Commissioned Officers, or useful handy

privates. The ordinary private learns enough in three year soldiering to fit him for any duty in the field. Every day beyond that is a day of weariness and idleness, and shall we say temptation to drunkenness. Of course in any short service system, the Non-Commissioned ranks would always be old soldiers as would be a percentage of men in the ranks, but they being a superior class, who must be well paid, must be fairly educated, and will certainly be constantly employed, there will be little danger of their sinking into drinking habits.

Looked at from a pecuniary point of view, even for foreign service, we think short service will in the end pay, as men will stand bad climates better when in the vigour of youth, than the old soldier does. We get rid too at a stroke of nine-tenths of the women and children who now form so large a proportion in the service, whose deaths in the tropics reach to an appalling figure, and who must form a part of long service Armies.

A short service Army is essentially an unmarried Army.

Our remarks apply on this short service subject principally to the Infantry, always the majority in the Army.

Cavalry and Artillery will always be men of longer service than the Infantry. As their work is more full of interest, and they are often men of higher stamp, they will not suffer by their long barrack life so much as Infantry do.

Moltke and the German school have always supported short service systems. French progressive soldiers do the same, and we may well follow suit particularly if it is to lead, as we think it will, to a more temperate Army.

**II. Second Aid.—FULLER AND HIGHER CLASS EDUCATION
IN GENERAL SUBJECTS IN THE ARMY SCHOOLS.**

It is true that a certain number of educated men give way to drunken habits. This vice claims its votaries from every section of society, but no one will deny that it is amongst the lower grade the vice is most common. The educated and well trained man has so many roads open to him to occupy his mind, that he is saved many temptations that waylay the ignorant and the idle.

Now we believe Army education although much advanced on what it was, to be still in its infancy as regards what it ought to be, and we think the soldier would be saved from some temptation if he was better taught and wakened up. He would be a higher type of being, less the animal, less given to the coarser expedients for amusement if he was a more cultivated man.

This culture can be given to him only by teaching, and by labouring to waken up his mind.

Our present petty system of schools does not do this. For so all-important a duty they are paltry expedients, and education loses in prestige when the head of the department in a regiment is merely a Non-Commissioned Officer.

The more the military science progresses, the more the Officer must become the teacher, and indeed has become so in most of the Continental Armies. We very much want an Officer in every Corps to preside over the school department, and we think the Officer now called the Musketry instructor should be the person. In him such duties may well centre, and we think education would bound forward were such a system introduced.

To-day our libraries and recreation rooms are of much less use than they should be owing to this want of teaching for the men, and many days now spent in routine parades, might be better employed in learning to grasp the "reason why" of things in the school house, from whence after all the truest discipline and real soldierly knowledge should spring. The Army is a school to-day for many good things. Its influence for good would be indefinitely increased, if it became a real educational centre for our ignorant adult males. By such work being done there, the whole country would be enormously benefited, and the Army itself be no loser.

The English winter and the Indian hot weather can both be well employed in school labors for the soldier, and duty should be so modified as to favor school instruction. Workshops and regimental gardens have not been successful in the Army in our experience, and their good must always be limited to a dozen or so of men in a Regiment, but education is open to all, and the more men learn the more they fain would know. Temperance and education are we think twin-sisters, and advance through the world hand in hand together.

III. *Third Aid.—FREE BEER CANTEENS AND ABOLITION OF ALL ISSUES OF LIQUOR AFTER FATIGUES OR DUTIES.*

When the state in old days fixed a definite beer allowance for the soldier, it acted in accordance with the then prevailing rule of our military service, which left nothing to the free will of the soldier, but interfered in every way with his life, nursing him like a baby.

To-day we are checking this system, and trying to awaken a sense of personal responsibility and individual thought in him. We think this aim would be assisted by abolishing all defining of the quantity of the beer allowances, and letting men drink at their will. At first it may cause some excess, but in the end things would soon find their present level, and then begin to mend. That is, the young recruits, and men arriving from England would find no amount defined for their use, and could not as they now do plead its existence as an excuse for drinking it. The Rum Ration would be altogether abolished in cantonments, and indeed everywhere save in the field.

In like manner all issues by officers after fatigues, marches, cricket matches, or theatricals should cease, and no encouragement be given to such customs, all of which we think tend to make men fall back upon liquor, encourage false ideas as to its value as a restorative, and in the end lead on to drunkenness.

IV. *Fourth Aid.—TOTAL ABSTINENCE SOCIETIES, AND BANDS OF HOPE.*

There are no more powerful agencies in existence for the spread of teetotal knowledge amongst the soldiery, or to foster total abstinence principles than the total abstinence societies of the service. Man is so essentially a social creature, that although individual and independent action is the best, yet in all movements affecting society combination is a necessity. To adopt a special line of action, or to stand up for a certain truth alone and single handed is doubtless noble and laudable, but it is a gift given to but few. Many minds are so much the slaves of conventionalism and custom, that to make them act singly and alone is as impossible as to make the ivy stand upright without the oak to support it. There are in the teetotal movement many strong minded men who fear no remarks of society, and are prepared to do battle single handed against custom, and for these personally such organizations are little required. No society is as strong as a single man standing up boldly for his ideas, but it is for the sake of the weaker organizations, the vacillating trembling minds who are blown hither and thither by every breath of public opinion and for whom a strong rallying point is necessary, that all teetotalers must combine to assist this movement. We want a body of enthusiastic and indeed bigoted men to stand forward as the storming party against injurious customs, to form the forlorn hope in the assault, and in whose following the average men can advance on their way. Undignified by any glory, and often exposed to the joke and jest of the thoughtless, these societies are in the end a well spring of good in a regiment and do much to raise the moral tone of the service.

Without such societies it would be impossible to diffuse amongst the soldiery real knowledge as to the value or dangers of strong drink. Through these means lectures can be given, pamphlets and papers circulated, and reading rooms supplied with temperance papers, established.

The strong ties of brotherhood and fellow feeling are awakened by these organizations. The trembling neophyte sees that he is not alone in his struggle, and the noblest cords of our common humanity respond when struck in the name of comradeship. Here a man can see assembled together those who believe that all use of intoxicating liquor is dangerous and deadly. That all compromise with temperance and moderation is for many minds a compact with death, and a covenant with destruction. That the very existence of liquor in the world is a curse far more than a blessing, and that alcohol in any form has been, and is a more deadly source of misery and misfortune to our race.

than any other cause whatsoever. Temperance and moderation have been tried and failed, every man who is a drunkard was once a moderate man, all half measures are ruinous, we want complete and total separation from this curse in its every form.

To support the weak hearted in these ideas, to present a bold front, to the onslaughts of the heedless of the world, to form a rallying centre for ourselves in moments of doubt and weakness these societies are needed.

To shew to the soldier who is doubting in his mind as to the principles of teetotalism, that there is a great mass of society in full sympathy with him, that non-drinking views are every day permeating all classes of society, to instruct him in the true knowledge of what drink is and of the misery it causes, these regimental societies are wanted and are existing to-day. They fulfil for the often ignorant man in the ranks, the same purpose that the conversation of the club or the mess-room does for the upper ranks of Army life. He is there educated and enlightened on these subjects and his often false notions are dispelled.

They are the best aids to discipline because they stand up against the one cause of all insubordination and military crime, and that is drunkenness. Without it our defaulter's sheets would be a blank, and the English soldier be as free from military crime as any fighting man in Europe.

Bands of Hope too are of great use. Our great hope is in the growing children and boys and girls.

That while still young and innocent they may be taught how terrible a danger strong drink is for them, to teach them to avoid it, and to point out to them the sad examples that exist but too often around them.

Our great hope is from the children. The future is in their hands and it depends upon their actions what the future is to be.

Such societies as the above should be non-sectarian, as wide in their grasp as possible, and never should allow political or sectarian questions to enter into what is thoroughly a moral movement extending to every sect and race of men in the world.

V.—*Fifth Aid.—GOOD FOOD AND DIET.*

We must not in our aims at the moral checks on drunkenness forget the physical aids to teetotalism. One of these aids is good, wholesome and nourishing food, and change in diet from time to time. It is not yet understood how often men drink because their coarse and indigestible or ill-cooked rations leave them with a craving for something else, and that craving is satisfied by drink. Every attention should be

paid to securing abundance of good food, and second only to this comes good cooking. No army in Europe is so unskilled at cooking as ours is, but efforts are now being made to teach men more thoroughly.

Tea rooms and coffee shops where a man can satisfy with wholesome articles the craving of a large appetite, or stave off those moments of depression every one feels at times, should likewise be encouraged. We are all liable to feel these moments of lowered vital power. These moments can be conquered by taking the mildest refreshments, and a cup of tea or a tumbler of iced lemonade, will do as well as stronger drinks provided only we accustom ourselves to them.

The body is essentially the slave of habit, and if we once begin to drink a glass of brandy in moments of temporary depression we shall always need it, but if we simply take iced water, gingerade, or tea, we soon get accustomed to regard these harmless drinks as stimulants and avoid all danger of intoxication. People say it is as bad to be the slave of tea as of brandy, this is not so. Tea whatever else it does leaves man's reasoning powers untouched. He is at any rate still a man. Brandy on the contrary assaults a man in his most distinctive faculty of reason, degrades him from his throne as the chief of the animal creation and leaves him far below the level of the brute, who is indeed often a higher creature by comparison.

VI. Sixth Aid.—SODA WATER MACHINES. ICE MACHINES.

We think a good soda-water machine most useful in a regiment. It supplies agreeable drinks to the men at a reasonable rate, and removes excuses for taking stronger drinks.

We believe that in this climate there are times of depression for the strongest of us. If men strive to conquer these moments by brandy they are ruined, but they can be and are banished by drinking tonic water, iced water, water alone, tea, gingerade and lemonade.

We once managed a regimental machine where the daily sales have often been over 100 dozens a day, and the monthly sales amounted to Rs. 1,500 or £150, in a single month. Our bills for quinine in making tonic water alone have been Rs. 100, in a month.

Soldiers never drink soda water, their drinks are lemonade, gingerade or tonic water, and these they drink freely if low priced. The price should never be more than one anna per bottle, for all kinds of drinks, and the bottles should be large. This price will pay fairly even for tonic water if the regiment be all together. There should be salesmen in each company to whom the machine should sell at 13 or 14 bottles to the dozen, any profits arising going to the salesman. Salesmen should be sent to all cricket matches, theatricals and parades with

the lemonade and a few tumblers. It is a trade capable of great extension, and a machine properly managed always pays well.

Barnett Son, and Foster, of Hoxton, London, are the manufacturers of the simplest and best machines, No. 4 machine is a good size. Total price of entire kit, £100.

Ice machines are still *in futuro* for the soldier. If a good strong cheap machine could be invented, and ice sold to the men cheaply it would be an immense boon.

Iced water alone is a tonic in this sultry climate.

A room where men could sit and take these drinks, arranged with little tables like a French Cafe and hung with pictures would be a great boon to the men, and save them from visiting the canteen.

• VII. *Seventh Aid.—DIFFUSION BY PAMPHLETS AND BOOKS, OF TRUE IDEAS ON THE USE AND VALUE OF ALCOHOLIC LIQUORS.*

We attach great importance to the existence of teetotal societies for the purpose of spreading true ideas concerning the liquor question amongst the men. In places where such societies cannot be organized and indeed as an aid to them when they do exist, the publication and circulation amongst the soldiers of pamphlets and books on the question is very important.

These publications can find their way into every barrack-room, every hospital, and every guard-room, and may fill up an idle hour usefully if they are read. Illustrated almanacks or pictures for the walls of the same character would be of use for such men as cannot read or do so with difficulty. The soldiers "small book" would make a good vehicle for saying some plain facts concerning this subject, and indeed on many other things a soldier ought to know.

Printed sheets of opinions selected from the writings or speeches of well known soldiers and physicians on the value of alcohol, and the little necessity there is for it, are most useful. Dozens of gallant soldiers have expressed their opinion on the high state of efficiency that armies of Englishmen have reigned in when quite shut off from liquor. Physicians, alike Civil and Military, have spoken in the strongest way against alcohol. Travellers and explorers who have penetrated the most heated portions of the torrid zone or wintered amongst the snowy regions of the north, have likewise spoken freely in favor of teetotalism. Their varied opinions collected into a condensed form should be laid at the feet of the soldier that he might never be ignorant of the facts of the case.

Alcohol cannot maintain its ground before the lights of modern knowledge. If that knowledge is only properly disseminated, total abstinence principles will not be losers by it. For it we should court all

enquiry, full of confidence in the result. The fiercest light that beast about the subject can but aid in its spread through the world.

VIII. *Eighth Aid.—ENCOURAGEMENT OF TEETOTAL PRINCIPLES BY THE OFFICERS OF THE ARMY.*

Probably in no Army in the world is the power of the Officer for any social purpose so influential over the soldier, as it is in the English service.

The men have for so many years been accustomed to receive every word from an Officer with unfaltering and ready acceptance.

The tie that binds them together is far stronger for attaining any special aim, than the bond that unites any conscript Army, and we think if the corps of Officers determined to achieve any object, the men would follow them as a body, so great is their attachment and devotion to them.

We do not now speak of mere disciplinary questions where men must obey, but of the petty social subjects which every day arise in regiments.

The teetotal cause in the Army is still a struggling cause slowly making head against the stream, but weak though it may be, it is every day gaining strength. What it would become if the corps of officers threw themselves heartily into the work it is impossible to say. We may judge from the progress it makes in corps where the principle is encouraged, and the little headway it makes where it is not supported by the Commanding Officers that the influence for good or bad is unlimited.

No word of encouragement should be needed by the Officers on this most important subject. One evil, most dark and monstrous broods over the soldier's life, and darkens his career.

One evil more deadly than the bullet of the Chassepot, or the lance of the Uhlan, and far more fatal in the long run than the bloodiest campaign, is year by year carrying off under our eyes crowds of gallant men, and showering untold misery and suffering on the rank and file of the service. That one evil once removed, crime in the Army would be unheard of, insubordination unknown, and a cheerfulness and happiness diffused over the service that it is impossible to imagine. To achieve so noble an end self-sacrifice on the part of the Officers is necessary to encourage a like sacrifice on the part of the soldiers. To live for England is far nobler, and indeed far more difficult than to die for her, and certainly in this noble cause much is to be gained by living for her.

The same devotion to duty that has often made the Officers work in the Cholera Hospitals to succour their men, can be exerted here, and those gallant soldiers who have never faltered when their Officers led

the way will we hope and believe follow them in this new field of battle, less distinguished perhaps, but certainly no less honorable than our most gallant fights.

IX. Ninth Aid.—BY ACTING ON THE RELIGIOUS ENTHUSIASM OF THE MEN.

Though placed last on the list, none can gainsay the importance of this means of checking drunkenness.

We cannot in a general Essay of this kind enter into the subject fully, but it is sufficient to say that if the ministers of religion all stood up for and fostered non-drinking, it would make great strides as a principle.

The religious nature of man is a most powerful agent to work upon. If urged on by it, no sacrifice is too heavy, no labor too great. Slowly action is being taken by the various sects in this movement and much good will result.

CONCLUSION.

Little now remains to be said. We have noted down our views of the cause of and checks on Army drunkenness. Patience is here a necessity. Much reason for hope exists for much good has been done, and the seed of much good has been sown.

It will take years to spread these teetotal principles, but spread they will. *The truth is great and it shall prevail.*

One branch of Army reform still remains to be carried out, and that is the reform of the drinking habits of the English soldier, the weakest of his few weak points. This gallant Army that has so often fought and conquered its foes in every quarter of the globe, and has carried the flag of England victoriously round the world, has yet to achieve one conquest more, the most brilliant and most noble it has ever been its lot to achieve, and that is it must conquer itself. To aid in that conquest and to assist in that reform is the duty of every Englishman whether soldier or not. If these pages assist however humbly to that great end, they will not have been written in vain.

GEORGE J. H. EVATT, *M. D., Surgeon Major,*

Army Medical Department

April 1877.

N O T I C E .

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1878.

Members can pay their subscription to the Alliance Bank, Simla if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton as they desire.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV and V to any member wishing for the same.

H. H. STANSFELD, LIEUT.-COLONEL,
Secretary.

ORIGINAL PAPERS.

I.

NOTES ON THE HISTORY, MATERIEL, ORGANISATION AND TACTICS OF ARTILLERY,

BY

CAPTAIN E. H. H. COLLEN, (*late R. A.*)

Assistant Secretary, Government of India Mili. Dept. (continued from No. 27.)

FRANCE.—The new era for artillery opened with the wars of the Consulate and the Empire.

The *materiel* underwent no great alteration, the 6 pr being substituted for the 8 and 4 pr. for horse and divisional artillery, and a 24 pr. howitzer was introduced. But beyond all other changes we may note the increased tactical employment of artillery under the great artillery officer Napoleon I. It is to his wars that we first look for instances of the important effects produced by this arm, in that concentration of fire which in those days was only produced by massing guns. After the peace of 1815 the artillery of foreign powers was the study of the French Artillery and military authorities.

The system of Gribeauval had served its time, and although much opposition to any change was again made, the reformers succeeded in introducing a new *materiel* in 1827 which consisted of a 12 pr. 8 pr. 6 in. howitzer, and a lengthened 24 pr. howitzer. Each six gun battery was composed of either four 12 prs. and two 6 in. howitzers, or four 8 prs. and two 24 pr. howitzers. The gun carriage, limbers and ammunition wagons were improved, so that the detachments could be mounted on them, and the mobility thus much increased. In the heavier battery each gun and wagon carried 92 and each howitzer and wagon 58 rounds, while in the lighter battery they carried respectively 128 and 88 rounds.

The results of these changes were simplicity, uniformity of construction and a powerful fire. A new mountain artillery equipment was also adopted, a powerful 12 pr. howitzer, but weighing only 220 lbs. was introduced, the carriage and ammunition boxes being carried on mules, an equipment which proved very serviceable in the Algerian campaigns. In

1852 Napoleon III, when President of the Republic, did much to simplify the *materiel* by introducing a 12 pr. shell gun, and abolishing one gun carriage, three natures of ordnance, and nine projectiles. This gun fired solid shot or shrapnel shell, and with its wagon carried 104 rounds. In 1858 rifled guns, 12 pr. and 4 pr. were adopted in the French service, and with the 8 pr. since introduced now form the artillery of the present day.

PRUSSIA.—At the commencement of the 19th century the Prussian Artillery was rather powerful than mobile, for the field artillery counted 216 12 prs. 96 heavy 6 prs. and only 120 light 6 prs., the horse artillery being armed with the light pieces. After the campaigns of 1806-1809, it was acknowledged that the *materiel* was too cumbrous and heavy. The artillery was reorganised in 1809, and in 21 batteries the largest proportion consisted of light guns. In 1816 a further reorganisation took place, each Army Corps having 96 guns, the proportion of heavy to light guns being 3-8. Later in the century the number of heavier guns was somewhat increased in each Army Corps. In 1806 there were 20 Horse Artillery batteries and in 1816, 27, and the Horse Artillery of the Prussian Service for many years formed the bulk of the "Reserve Artillery."

The *personnel* of the Prussian Artillery has developed enormously during the 19th Century. In 1805 a regiment of Horse Artillery was formed of 10 batteries. In 1808, the Artillery was formed into 3 brigades, each consisting of 6 foot or field, and 2 horse artillery batteries. The number of brigades was increased to 9 in 1814, each being composed of 12 field and 3 horse artillery batteries. Besides these, there were in each, 4 garrison batteries and 1 company of artificers. During the years of peace which followed the Napoleonic wars, Prussia laboured to improve her military power in every respect. The field artillery made great progress, and was increased in strength.

Up to 1861 the field artillery of an army corps consisted of four 6 pr. field batteries, three 6 pr. horse artillery batteries, three 12 pr. batteries, and one 7 pr. howitzer battery, or 11 batteries with 88 pieces and in addition 8 ammunition etc. columns. In 1816 the system of brigades was abandoned and the artillery was organised in 9 regiments of field artillery consisting each of 12 field and 3 horse batteries, and 9 regiments of garrison artillery of 8 companies each, corresponding to the Army Corps of the Prussian Army. It was with this force of artillery that Prussia undertook the wars of 1864 and 1866. In the latter war the Prussian Artillery did not shine so much as its Austrian adversary, and many deficiencies were brought to light, which were carefully remedied in the few years of peace which followed. In 1867 an addition was made of 3 Prussian regiments and 1 Saxon regiment of Field Artillery, with 4 divisions of garrison artillery of 4 companies each. It was with this establishment the war of 1870-71 was commenced. The South German Forces contributed 4 regiments of Bavarian Artillery, 12 Wurternberg batteries, 10 Baden, and 6 Hessian batteries, and 26

Garrison companies belonging to the South German Armies. No less than 17 regiments of field, and 9 regiments of garrison artillery, took part, or were effective for service in that war. In 1872, the German Artillery was increased to 34 regiments of field artillery, and measures taken to augment the force by 13 additional regiments, and 7 battalions of garrison artillery, the total being raised to the enormous strength of 47 regiments of artillery.

AUSTRIA AND RUSSIA.—These powers have not been behind hand in the giant strides made by artillery in the 19th century. The Austrian Artillery has during this century always been pre-eminent both in the excellence of its matériel, and in tactical handling in the field. In 1859 when rifled guns were introduced, Austria had long been experimenting on the use of gun-cotton for artillery purposes, and in 1861, a system of rifled field and mountain artillery was adopted, under the auspices of Colonel the Baron Von Lenk, the great experimentalist in this direction. This system was not long lived, for the numerous accidents which occurred obliged the Austrian military authorities to renounce it altogether in 1862-63. In 1863 a new system of muzzle-loading rifled guns was introduced. These guns were the 3, 4 and 8 prs. the first being intended for mountain service. A great development of artillery has taken place in the last few years, and which will be treated of in the account of the artillery of the present day.

In 1861 Russia adopted the French system of rifled guns, but in 1866 after the war between Prussia and Austria she abandoned it for the breech-loading system of Prussia, and drawing on the manufactory of Krupp at Esen, she has succeeded in arming her field artillery. Russia of late years has manifested the greatest activity in all matters connected with artillery, the re-equipment of her siege, garrison and coast artillery has been energetically proceeded with, and her manufactories for the *matériel* of war placed upon an efficient footing. Since 1869 many improvements have been effected in the whole *matériel*. It was in that year Russia commenced to re-arm her fortresses, and in two years, more than 1000 rifled guns, complete in every respect have been supplied and mounted.

Powerful siege-trains and parks have been prepared, a special one for the army of the Caucasus, numbering 100 pieces, having been organised. Batteries of 4 pr. guns have been added to the artillery brigades, 38 batteries of Mitrailleuses have been created, and a reserve of field artillery of no less than 1200 9 and 4 pr. guns have been established. In 1870 there were only 3 batteries per division, an augmentation has since taken place so that now a brigade of 4 batteries is attached to each division.

B. Technical.

The artillery *matériel* of England is divided into, 1st Field, 2nd Siege, 3rd Garrison and Naval.

The *Field Artillery* subdivides itself into

- a. Mountain Artillery.
- b. Horse "
- c. Field " proper.
- d. Position, or heavy field artillery.

Details will be found under the respective titles, but it is necessary to mention briefly the principal matériel used for the different species of artillery, in order to comprehend their equipment and organisation under the Section *c. Organisation and Administration*.

A. Mountain Artillery.

Has for many years past been used in India, where the details have from time to time been changed by the light of experience. In England the first organisation of a mountain battery which occurred for many years, took place in 1868 when two batteries were turned out for the Abyssinian expedition, each with six 7 pr. M. L. R. guns, steel carriages, ammunition, rockets etc. The gun which has now been adopted is the 7 pr. steel M. L. R. gun of 200 lbs. of 3" calibre and is intended for mountain or boat service, but several patterns are still in existence both of steel and bronze guns.

CARRIAGES.—The carriages for the 7 pr. gun are made entirely of iron, the axletree consisting of a stout bar of wrought iron, the brackets of single plate iron being housed directly across it.

PROJECTILES.—The elongated projectiles of the 7 pr. are common shell, double shell, shrapnel and case ; the double shell is for firing at high angles with a reduced charge, and the gun being used as a small howitzer, a modified form of vertical fire is secured which is very useful in hill campaigns. A "star" shell consisting of a thin iron shell containing stars of magnesium light composition has also been introduced for this gun for lighting up an enemy's position at night.

B. Horse Artillery.

After the abolition of the S. B. guns the Armstrong system reigned from 1859 to 1867-68, but now that has passed away with the exception of a few batteries in India.

GUNS.—In the United kingdom, batteries of H. A. are exclusively armed with six 9 pr. M. L. R. guns of wrought iron with tempered steel tube. In India, however, there still remain batteries with six 9 pr. armstrong guns. The union of guns and howitzers in one battery constitutes what is called a "mixed" battery. It was supposed to have an advantage over a battery of guns alone, in that it commanded every kind of fire used in the field and was adopted to every variety of circumstance. There was a serious objection in the fact, that the differences between the gun and howitzer are so great in range and employment,

that if used simultaneously the fire of one kind was comparatively neutralized.

The 9 pr. M. L. R. gun will probably give way to a lighter gun weighing only 6 cwt. The present gun weighs 8½ cwt. has a calibre of 3" and with loaded limber etc., gives a total weight behind the team, of 3,920 lbs. which is looked upon as excessive for horse artillery.

A horse artillery battery in our service consists of 6 guns 3 ammunition wagons in peace-time and 9 on a war footing, 1 forge, 1 store and 1 general service wagon, 1 store cart, and 1 cavalry small arm ammunition wagon, total 14 or 20, but this is somewhat modified in India, and probably the number of ammunition wagons will be lessened when the system of "ammunition columns" is fully brought into play. Briefly, this system is, while giving each battery a sufficient number of wagons to render it independent under ordinary circumstances of battle, to maintain in separate columns for the different fractions of the army, reserves of artillery and small arm ammunition which shall follow the fortunes of those fractions in the course of an action, and yet be sufficiently in rear to avoid the danger of hampering the more combatant portions of the army.

DESCRIPTION OF CARRIAGES.—The construction of our carriages is very solid, and many foreign critics as well as of our own country, aver that we go too far in this direction. It is certainly the case that we lose something in mobility in great strength and weight, but it must be remembered that English carriages must be so constructed as to endure all extremes of climate, and that it is most unadvisable in an Imperial point of view, to multiply local patterns. The gun carriage for horse and field artillery is of wrought iron. The ammunition wagons are built on a framework of wrought iron, with wrought iron perches. The ammunition boxes are of wood.

AMMUNITION PROJECTILES.—The projectiles for the 9 pr. M. L. R. gun are common and shrapnel shell, and case shot. The fuzes used are the M. L. field service percussion fuze for common shell, and for shrapnel shell, when intended to burst on the graze of the shell, while 5 and 9 Sec. wood time fuzes are used also, the former with shrapnel and the latter with both common and shrapnel shell.

The stores for both horse and field artillery batteries are numerous and the details will be found in the regulation hand books and equipment tables. The method of carrying these stores will be mentioned under the head of C. organisation and administration, but they consist generally of camp equipment, intrenching tools, harness and saddlery, artificers tools, ordnance stores and miscellaneous articles.

C. Field Artillery.

This term has a particular as well as a general signification and in our service means these batteries (formerly called foot) which are

theoretically not supposed to move fast, or rival the speed of horse artillery. There are many however who assert, that this distinction is the relic of a byegone day, and that as we shall not be able again to see horse artillery gallop up within short range, because the precision and rapidity of breech-loading rifle fire is so great, it would be better to make only one separation of artillery into horse or very mobile field artillery and position batteries of heavy guns. Until within lately, the field artillery of England did not posses sufficient mobility, as no means were provided for bringing up the gunners, if the ammunition wagon was any distance to the rear. The gunners were directed to march beside the gun, and as they could only be mounted on the limber of the gun, which would at the most accomodate 3 men, the gun could without the wagon be brought into action only very insufficiently served. In the Indian artilley, constant necessity for rapid movement had caused them to adopt axletree seats, by which 2 more gunners could be mounted, one on either side of the gun, and saddles were also provided for the lead and centre horses of the gun-team, so that with the mounted non-commissioned officer, 7 men could be at hand to serve the gun, independently of those mounted on the wagons.

GUN.—There are several guns now in the service for the ordinary batteries of field artillery :

- (1.) 9 pr. M. L. R. gun of $8\frac{1}{2}$ cwt.
- (1. a.) 9 pr. M. L. R. gun of 6 cwt. for R. H. A.
- (2.) 12 pr. B. L. Armstrong gun of 8 cwt.
- (3.) 16 pr. M. L. R. gun of 12 cwt.
- (4.) 9 pr. S. B. and 24 pr. howitzers*.

(1) and (3) are however par excellence the field guns of the day and probably of the future for some years to come, (2) has been superseded in England, and will ere long become obsolete in India where the whole of the field artillery has been re-armed with the 9 pr. M. L. R. gun, (4) also being withdrawn as new guns are received from England. (3) has been given to several batteries in England, and the advantages of the superior power of this gun render its adoption for field artillery desirable. At the same time some consider that its weight is inconsistent with great mobility, and that it is questionable whether this, with other disadvantages may not counterbalance its superiority in other points. On the other hand the 16 pr. M. L. R. gun carriage and equipment, though heavier than similar equipments in continental armiea, gives us the most powerful field gun in Europe, and the modern conditions of battle seem to point to the propriety of artillery remaining stationary as long as possible, especially as the object of fire can now be attained by increase of range rather than by a constant shifting of position.

* Hyderabad Contingent.

CARRIAGES.—The gun carriages for (1) and (3) are of wrought iron.

That for (2) has already been described, and for (4) is of wood and gradually becoming obsolete.

AMMUNITION PROJECTILES.—The projectiles for (1) and (3) are common shell, shrapnel and case, the former used against earth-work, buildings etc., the second against troops, and the third for close quarters. The fuzes used are percussion and wood time fuzes.

D. Position Artillery.

In England no manned batteries are kept up for this species of artillery, which is a heavy field artillery, capable of movement, but not requiring to move fast or to change positions frequently. It would be used in the defence of particular and important points on a battle field, intrenchments etc.

Hitherto the B. L. 40 pr. Armstrong has been used, but it is probable that the 24 pr. M. L. R. gun of 22 cwt. will be the gun of the future for this purpose.

In India, position artillery is maintained in the form of "Heavy Field Batteries" two being armed with 40 pr. Armstrongs and 8" mortars, and the other two with two 18 pr. S. B. two 8" howitzers and two 8" and 5½" mortars. The guns are dragged by elephants, and the mortars and ammunition wagons by oxen.

CARRIAGES.—The carriages at present in the service, are of wood, block trail pattern and of great strength.

AMMUNITION PROJECTILES &c.—The projectiles for 40 pr. Armstrongs are common, segment, and boxer shrapnel shell. For 18 pr. S. B. guns, common and shrapnel shell, case and round shot.

The fuzes used are for the 40 pr. A. G. for segment and common shell, Pettmann's General Service percussion fuze, and Boxers wood time fuzes, 20 Sec. fuze for segment and common 9 Sec. for the shrapnel, common and segment shells.

Rockets.

A few words must be said as to their employment in war. Although perhaps not the inventor of the principle, Sir W. Congreve, in 1804 was the first to devise means for their use in war. They were used in 1809 in the Walcheren expedition, and with immense success at Leipzig. Rockets are carried by Field Artillery in special rocket carriages when required. The employment of rockets in war has however somewhat fallen into discredit on account of the danger of the service, and the inaccuracy of flight. The rockets now in the service Hale's, have no stick. The experiments with them lately have not been

very successful. The Rocket Troop of Horse Artillery has long since been abolished, but it did excellent service in its day. Hale's rockets are used in mountain warfare and were so employed in Abyssinia. Against savage tribes, and where carriage is not available for the transport of the field pieces of the present time, rockets will probably continue to be used with effect. The mitrailleur or gatling may be classed under field artillery.

Siege Artillery.

GUNS.—Hitherto, with the exception of the Lancaster guns, England has not had experience of the employment of rifled pieces at Sieges, of the screw B. L. guns, the 40 pr. and 7 in. guns were intended for siege purposes. The new M. L. R. wrought iron guns, 40 pr. and 64 pr. will probably form part of any future siege train. Their weights are 35 and 64 cwt. respectively. The M. L. R. howitzers, 10 in. and 8 in., and 10, and perhaps 13 in and 5½ in mortars (or a rifled mortar) will be associated with these.

In India siege trains are kept in readiness in the different arsenals, and transport is maintained for them. These siege trains consist at present of S. B. pieces, and mortars, but will be replaced by rifled guns.

CARRIAGES.—The carriages employed are gun-carriages and limbers, howitzer and mortar carriages, and sling wagons fitted with windlass arrangement so that guns can be slung up underneath. For the heavier pieces iron sling wagons are used. We may expect considerable improvement in the siege carriages so as to admit of the abolition of embrasures and for the gun to be fired over the parapet, either by mechanical arrangement as in the German siege carriage, or by some application of Moncrieff's principle of utilization of recoil power, or by hydraulic power even. At all events it will be more than ever necessary to secure the safety of the gunners.

AMMUNITION PROJECTILES &c.—The projectiles for the B. L. 40 pr. have already been mentioned. The M. L. R. 64 pr. uses common and boxer shrapnel shell and case shot, and takes Pettmann's B. S. *percussion* fuze, and the 9 Sec. and 20 Sec. Boxer wood *time* fuze with common, and 9 Sec. and 5 Sec. fuzes with shrapnel shell, Boxers large wood *time* mortar fuze is used with the larger mortar shells, and the small size with the lesser mortars as 5½ in.

3 Garrison Artillery.

GUNS.—For Fortress-defence large numbers of S. B. 68, 32, 24, prs. and 8, 10 in. shell guns are still mounted, and even smaller iron pieces in India and the colonies. The general tendency is to replace these with rifled guns of calibre suited to the importance and object of the works, while the Mitrailleur or Gatling gun may not improbably be used in flanks and for the defence of ditches, in which positions this latter

weapon, secure in casemates would be of the highest value. The M. L. R. guns are 7, 8, 9, 10, 11 and 12 in. the latter weighing 35 tons.

CARRIAGES.—It would be out of place here, to do more than mention, that the old S. B. garrison carriages are of wood, possessing various arrangements and platforms for traversing. In India iron carriages have been used. The new carriages for the large M. L. R. guns are of wrought iron with hydraulic buffer arrangements. The Moncrieff carriage and system by which the gun is loaded and laid in a gun-pit, and raised by a counterweight released, again descending after firing by the regulated power of the recoil, will probably be extensively employed in coast defences, while further experiments may show that water or steam power may be utilized for this object. At all events there is a great field still for inventors, in designing the simplest, most powerful and economical carriages for the immense ordnance now used.

PROJECTILES AND AMMUNITION.—The projectiles of the M. L. R. guns are common shrapnel, and Palliser shell, and case and Palliser cored shot, and attain the enormous weight of 691 lbs. The fuzes employed are Pettmann's G. S. percussion, and Boxer's wood time fuzes.

France.

GUNS.—Up to this date the French Artillery has been somewhat in a transition state, and it is difficult to speak with confidence on the result of the extensive artillery experiments which have been instituted. Hitherto the following have been in the service :—a 9 pr. (shell) mountain gun of 2 cwt. 9 pr. of $6\frac{1}{2}$ cwt. for field artillery (canon de 4) 16 pr. of $11\frac{1}{2}$ cwt. (canon de 8) 25 pr. of 12 cwt. for position artillery (canon de 12) 50 pr. of 40 cwt. (canon de 24) for siege purposes. These are of bronze and rifled on the La Hitte system.

For naval service B. L. rifled guns of cast iron strengthened by rings have been employed, these guns range from 70 pr. to 300 pr. In the recent artillery experiments in France of the various French guns alongside the English M. L. R. steel tube 9 pr. the latter, which is rifled on principles originally proposed by Colonel H. H. Maxwell, C. B., R. A., proved itself decidedly superior, and the French may therefore be expected to prosecute further their researches after the best possible field gun.

CARRIAGES.—The use of iron is coming into great favor, and the advantage of a non-perishable matériel is apparent when we remember that in the present conditions of warfare a large number of guns and carriages must be kept in store to complete to the full number of war footing, the minimum of peace time.

PROJECTILES &c.—The French field guns fire studded projectiles, shell, shrapnel and case, their heavy guns having elongated projectiles of similar natures.

Prussia.

GUNS.—The Prussian artillery matériel is divided into field, siege, garrison and naval. The *Field* guns consist of the 8 centimetre (3·12") gun of cast steel, called by us a 4 pr. rather inappropriately, as it fires a projectile weighing 8½ lbs. They have also a heavier field gun, the 9 centimetre (3·51") with 14 lbs. shell, called by us 6 pr. Experiments have been lately made at Tegel with the former gun, only built more strongly at the breech, and, it appears to have been adopted in its altered construction the weight being reduced for Horse Artillery, while for the Field Batteries it is contemplated to give them a heavier gun than the present one of 9 centimetre calibre.

For *siege* purposes the Germans use the 12 cent. (4·68" calibre) gun of cast steel, firing a 29 lb. shell, and a similar gun in bronze, and steel and bronze guns of 15 cent. calibre (6·85") firing 54 lb. shells.

The mortars used are 8 in. *rifled*, and S. B. 15 cent. (6·85").

As *garrison* guns they have besides smaller pieces in steel and bronze, 12 cent. gun (4·68") in cast iron and bronze, 15 cent. (6·85"), 23 cent. or 9" cast iron howitzers, and heavy guns for garrison, coast and naval purposes ranging from 7" to 13" calibre, adopted in Saxony, Bavaria, Austria and Russia. The carriages for rifled guns adopted in 1864 are 5 in number, viz., for the 8 c. and 9 c. field guns, the 9 c., 12c. and 15c. siege guns. The siege carriages have a peculiar arrangement of iron supports on the cheeks by means of which the gun is enabled to fire over the parapet. The wagons are, ammunition wagon (*munitions wagen*), provision wagon (*Vorraths wagen*), forge (Feldschmiede). These are of the models 1842, 1864 and 1869. The ammunition wagon carries one large box, opening to the rear.

AMMUNITION PROJECTILES.—For S. B. pieces are shot, shell, shrapnel and incendiary projectiles. For rifled guns, common shell for all calibres, shrapnel for the 8 c., 9 c. 12c. and 15c. guns, case for 8 c. and 9 c. guns, and solid shot for 15 c. guns and superior calibres.

The Prussian field guns can be fired with sufficient care as to laying etc., 5 rounds of case in 3 minutes, 4 or 5 of shell. Shrapnel shell has only been introduced lately.

Austria.

GUNS.—The existing pieces are 3, 4, 8 pr. rifled bronze guns for *field* artillery the two latter having calibres of 3·4" and 3·9", and firing 7 lbs. and 13 lb. shell, respectively. For *siege* and garrison artillery, B. L. 12, 24 prs. also 8 in. bronze guns. The Austrians have adopted 8 in. bronze rifled mortars, breech-loading.

The *siege* matériel still comprises S. B. cast iron pieces, including mortars of large calibre.

CARRIAGES.—The field carriages are double cheeked or bracket like the Prussian. A box to hold case is fixed on the trail about half-way between the breech of the gun and the point of the trail and adapted to form a seat. The draught is 4 horses to the 4 pr. field batteries and 6 to others. The siege carriages are wooden. The garrison carriages are of two kinds, depression-carriages and fortress-carriages.

AMMUNITION PROJECTILES.—For field guns are common shell, shrapnel, incendiary shell, and case. As in the Prussian artillery, the percussion fuze is used and time fuzes for shrapnel, the peace establishment of a 4 pounder battery consists of 109 or 115 officers and men according as the battery is a field or a horse one and with only 16 or 24 draft horses. On the war establishment the number of officers and men is increased to 170 with 90 horses for a field battery and 190 officers and men, and 128 horses for a horse battery and similarly with the 8 pounder batteries.

G. Organisation and Administration.

It will be well to consider the organisation of the unit before attempting to describe the manner in which those units are combined, and with this object we shall sketch the organisation of the battery. The British Artillery is divided into Horse, Field, and Garrison, and in war time a greater division might take place into Mountain, Horse, Field, Position, Siege and Garrison Artillery. The division of peace time however only extends so far as the combinations of batteries known as Brigades of Artillery, either as horse, field or garrison. The officers and men are in one Royal Regiment of Artillery and may be transferred from one branch to the other.

Field Artillery.

a. Mountain	...	Batteries.
b. Horse	...	
c. Field	...	
d. Position	...	
e. Siege	...	

Field artillery requires for the constitution of a battery three elements* viz : matériel, personnel, transport.

Matériel	... {	Pieces of ordnance.
		Carriages for guns, ammunition and stores.
		Ammunition and stores.

* From Owen's Modern Artillery.

Personnel	... { Officers. Non-commissioned officers. Gunners to serve. Drivers to groom and drive. Artificers.
Transport	... { Horses, mules (in Europe.) Elephants. Oxen.

} in

A :—MOUNTAIN BATTERIES.—In England no batteries of this kind are maintained, although the equipment would be forthcoming. The personnel would be supplied from the Garrison Artillery. The equipments sent to Abyssinia in 1867-68 were each composed of six M. L. R. guns, steel carriages, ammunition boxes, rockets, for requiring 38 mules according to the detail first laid down, but a subsequent modification was found necessary. The guns were carried on the backs of mules transversely, supported on iron saddles or cradles. This is generally considered however more expedient in mountain countries to carry the guns lengthwise ; the carriage is distributed between 2 mules, one carrying the bed and trail, and the other the wheels. The ammunition is carried in boxes, a pair to each mule. Thus the order of march is gun mule, carriage mules, ammunition mules. Mules are also provided for a small forge, and for the artificers, tools, spare stores, camp equipment and baggage. The personnel will be determined according to the nature of service. The great point is to have a good saddle or cradle and not to overweight the mules, 200 being the maximum weight which should in addition to the saddle, be put on a mule required for hard work and long marches. The drivers are led either by artillery-men, or by native drivers or muleteers in India.)

In India, mountain batteries consist of two kinds, European and Native, both being officered from the Royal Artillery. There are European mountain batteries in India, stationed in the Himalaya. The detail of each is 6 officers (including surgeon) 23 non-commissioned officers and trumpeters, 1 collar-maker, 70 gunners ; total 100, with native drivers, besides a native establishment of muleteers for baggage mules, grasscutters, artificers etc. ; and 182 mules. The personnel of the Royal Artillery is provided from the garrison artillery and changed periodically. There is also a mountain train attached to a Garrison Battery, R. A., in Burmah. There are 2 Native Mountain Batteries in Bengal and 2 Native Mountain Trains attached to Native Infantry in Scinde, under the Bombay Presidency.

It is contemplated to increase the Mountain Batteries of India by turning certain native field batteries attached to the local "Punjab Frontier Force" into mountain batteries. The transport used is mule and pony and the number of guns in mountain batteries is either 6 or 4.

ned officers.
e.
n and drive.

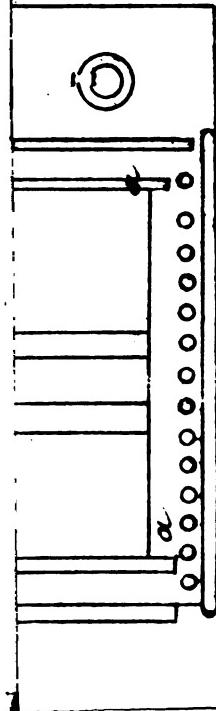
n Europe.) }
} in 18

and no batteries of this
ould be forthcoming in
on Artillery. The
n composed of six
boxes, rockets, for
st laid down, but a
e guns were carried
on saddles or cradles.
expedient in mount
e carriage is dist
d trail, and the o
a pair to each m
rriage. mules, amm
orge, and for the ar
ge. The personnel
ce. The great pain
eight the mules, in
addition to the sugg
ng marches. The
drivers or muleteers

wo kinds, European
Artillery. There
tioned in the His
(on) 23 non-commis
ners; total 100, in
of muleteers for be
mules. The personal
n artillery and the
attached to a Gua
tive Mountain Batt
ied to Native Infa

n Batteries of Inf
el to the local
transport used in
tian batteries in

1917
NOV
27/1917



B:-HORSE BATTERY.—Horse artillery batteries differ from field batteries in possessing a lighter equipment, and in having the detachments of gunners to serve the guns, mounted on horses. The matériel has been mentioned and it only remains to say, that in England, on a peace footing, the detail of guns and carriages is as follows : 6 guns and 6 carriages, 6 ammunition wagons, 1 forge, 1 store limber wagon, 1 store cart, 1 general service wagon. The latter is not used in India. In India each battery has 6 additional ammunition wagons, either kept with the battery or in an arsenal according to circumstances.

Each limber has 2 boxes and the body of ammunition wagon 4, each box contains a centre compartment with 18 filled cartridges, 2 compartments front and rear each with 6 shrapnel shells, and 2 side compartments containing 3 common shell and fuzes in proportion,

The ammunition carried is 4 case shot in the axletree boxes of the gun carriage, 12 common shell, 24 shrapnel in limber of gun, and 36 common shell, 72 shrapnel, in the ammunition wagons.

A total of 148 rounds per gun is thus carried with each battery, on the assumption that each H. A. battery will have 6 ammunition wagons in war time.

The stores for horse and field batteries are numerous, consisting of camp equipment, entrenching tools, harness and saddlery, artificers' tools, ordnance stores and miscellaneous articles, the details of which will be found in the regulation hand books and equipment tables. These are packed and carried on the different carriages of the battery. Thus the gun limber carries dragropes and axe in front and other implements such as spade, shovel, pickaxe at the side of the boxes or underneath, a centre box on the limber contains time and percussion fuzes and friction tubes. On the lids of the boxes inside are carried various fuze implements, and a camp kettle and two leather buckets are carried under the limber boxes. Traversing handspikes and sponges are carried on the gun carriage itself and in the axletree boxes, beside the case shot, linch pins, dragwashers, gunspikes &c.

The waggon is packed much in the same way, but two camp kettles are carried under the body, and a spare wheel in front, 3 picket-posts are carried on each side of the body and under each alternate waggon of the battery a spare shaft or axletree. The tents are packed between the ammunition boxes and the many other stores distributed in various ways throughout the battery.

These stores are distributed throughout the battery, and this system though efficient in so much that it enables a battery to be independent, has the disadvantage of hampering a battery marching in the presence of an enemy, with this additional weight. If we imagine batteries marching with the advanced guard in a hostile country we can perceive the misfortune of encumbering them with all these stores and baggage

and it would appear, on this view, more advisable, to allow each battery light baggage-wagons for tents and spare stores, which could march in rear with the train of the army, or to provide for its camp equipment &c. from the general army transport.

The personnel of our horse artillery batteries is as follows :—

	Peace Establishment.	War Do.
Officers	... 5 *	5
N.-C.-O.s' & trumpeters	20	22
Artificers	... 5	10
Gunners	... 70	74
Drivers	... 56	79
Horses† { riding ...	54	62
{ draught ...	78	130

In India a battery of Horse Artillery consists of 7 officers (including surgeon and veterinary surgeon) 20 non-commissioned officers, 78 gunners and trumpeters, 54 drivers, 6 artificers and 178 horses, but it has also a large non-combatant native establishment, as 23 subordinate medical and hospital establishment, and no less than 339 artificers and followers of various kinds. Each carriage in a H. A. battery has 6 horses except the G. S. wagon and store cart which have only 4. The horses are teamed in pairs, lead, centre and wheel, the drivers are mounted on the near horses. The off horse of the wheel is in the shafts, much controversy has been raised as to the respective merits of " shafts" or " pole ;" the latter was in use in India for many years and is employed by continental nations. The balance of advantage seems to lie on the side of shafts. The harness is strong and fairly simple. The off horses have pads upon which the valises containing the drivers kits are carried.

Horse or field artillery is organised in our service in the proportion of 6 guns per battery, and this number obtains also in France and Prussia, while in Russia, Austria, Belgium, there are 8 guns in a battery. Our batteries are divided into 3 divisions of 2 guns each, each division into 2 sub-divisions of 1 gun, wagon etc. each, so that there are 6 sub-divisions in a battery. The number 6 is not a convenient one

* Excluding Surgeon and Veterinary Surgeon who will be appointed according to requirement.

† Exclusive of officers chargers.

as occasions often happen when the battery must be divided equally and the consequence is that the $\frac{1}{2}$ batteries divide the centre division between them. Unless it can be shown that a battery of 8 guns is unmanageable, the latter has decided advantages. It admits of being split into equal fractions, and the half battery of 4 guns is a small but convenient battery for any particular service, *The larger the unit, consistent with tactical considerations, the fewer will be the number of non-fighting carriages as forges etc., taking the artillery of an army as a whole, and the more economical and efficient the system.*

The proportion of ammunition to be carried by batteries is an important question and their replenishment in the field not less so. Formerly batteries were hampered by a large number of wagons, and they also supplied small arm ammunition, the horse artillery batteries for the cavalry, the infantry being supplied from the field batteries, and these extra wagons were supposed to accompany the artillery at a safe distance. This plan was stated to be advantageous in that the infantry knew at once where they could obtain supplies of ammunition. The disadvantages are numerous and the most powerful one is that this system encumbers the field artillery to a serious extent and is wasteful in time and distance.

Further than this, the artillery may be posted on advantageous ground and may not quit it for hours while the infantry are advancing and need a supply of ammunition. Under the new theoretical organisation of a British Army-Corps the supply will in future be by "ammunition columns" composed of 12 artillery, and 14 infantry small arm, ammunition wagons, with store wagons, etc. Each division of infantry will have 1 ammunition column and the Reserve or *Corps Artillery* a separate Reserve Artillery Ammunition Column, and it will easily be seen that this system must be both efficient and economical, as the average expenditure of each taking the whole of the batteries together cannot be equal to the maximum expenditure of one battery, and one battery may fire more rounds, and another a fewer number than the regulated proportion.

The proportion of ammunition to be carried must be based on past experience. At the battle of Lützen 1813 the French fired 220 rounds per gun, and on this they based their proportion. But conditions have changed since then, and it is probable that the introduction of guns of precision has tended to lessen the expenditure of ammunition per gun, but we must remember that the size of armies and the proportion of artillery has vastly increased. In all the great battles of the Franco-German war of 1870-71 the maximum average was reached at the battle of Vionville or Mars-la-Tour 16th August, 1870 when 94 rounds per gun were expended, but at many of the great engagements not more than half this average was reached, and though it may be said that some batteries fired a much higher average, we must remember that this only points to an efficient organisation of ammunition columns, and

we may well be content with the amount of ammunition now carried by our field artillery, always provided we really organise in peace time the proper system of supply of ammunition in the field.

FIELD BATTERIES.—Differ from the foregoing in that they have a heavier armament, the gunners are not mounted, and the batteries are not supposed to go as fast as H. A.

MATERIEL.—The matériel is similar and the *personnel* does not differ substantially from the horse batteries. The gun, carriages and ammunition have been spoken of under the heading *B.* Technical-field artillery.

A field-battery under the present system on a war-footing has 6 guns and carriages, 12 ammunition wagons, 1 forge, 1 store, 1 general service, wagon, 1 store cart, total 22, but in time of peace only 6 wagons are maintained, and in India the remaining 6 wagons known as the second line of wagons are kept in readiness in the arsenals, except at certain selected points where they are attached to the batteries.

The amount of ammunition carried with the 9 pr. M. L. R. batteries and method of packing has been detailed under the head of horse artillery. With the 16 pr. M. L. R. field batteries the arrangement of the ammunition and packing of the boxes and stores is similar to that of the 9 pr. M. L. R. batteries. The near limber box of both gun and wagon contains 7 common and 5 shrapnel shells, the off one 5 common and 7 shrapnel, while the front wagon boxes contain each 5 common and 7 shrapnel and the rear boxes 12 shrapnel so that with 4 rounds case in the axletree boxes, the gun and wagon carry 34 common shell, 62 shrapnel and 4 case, or 100 rounds altogether.

'The personnel of field battery in England is as follows :—

	Peace Establishment.	War Est.
Officers	5	5
N.-C.-O.s'	19	20
Artificers	7	9
Gunners & trumpeters.	68	87
Drivers	61	81
TOTAL.	160	202
Horses { riding	12	34
{ draught	76	150
TOTAL.	88	184

The peace establishment however is not a fixed strength, but varies according to the financial requirements of the day, or the views current as to a necessary strength in time of peace. The strength also is somewhat higher for those batteries which are first on the roster for foreign service. The officers and non-commissioned officers are armed with swords, the gunners with sword-bayonets and the battery also carries a proportion of carbines. In the Horse Artillery all are equipped with swords.

In India a field battery is composed of 6 officers, 20 non-commissioned officers, 78 gunners and trumpeters, 54 drivers, 5 artificers, total 163 with 110 horses. There is also a large native establishment attached, 23 subordinate medical, and field hospital establishment, and 224 lascars, grooms, grasscutters, native artificers etc. There are no horses for the 2nd line of wagons, which when taking the field are dragged by bullocks. There are also differences in the manner of carrying the camp equipment baggage etc., and these variations from the English system apply both to Horse and Field Artillery and are necessitated by the circumstances of country and climate. The gun carriages and ammunition wagons are equipped in much the same way as in England and packed similarly (*i. e.*, with the 9 pr. M. L. R. batteries which will constitute the field artillery of India, perhaps with the addition of 16 pr. batteries) with the various tools, implements and stores. The camp equipment however is larger and instead of the circular or bell-tent, a large double pole marquee is used, and is carried on camels provided by the commissariat. Sheepskins, cornbags, forage nets, and wooden canteens are not used in India as they are not suited to the country. The men's blankets and baggage are carried on camels, while one blanket for each horse is folded on the ammunition boxes of the gun limber and wagon or rolled round the drivers valises carried on the off horses. The second blanket for each horse is carried on camels. Picketing pegs are carried in canvas bags on the foot boards of the wagons, and the line gear or stable requisites are mostly carried on camels. In England the picket ropes and posts are carried on the first line of wagons, and each mounted man has a head rope and the forage cord may be used as a heel rope, one peg and a leather shackle being carried also for this heel rope.

The interior economy or organisation of a battery is much the same in field or horse artillery. Upon the major commanding depends to a great extent the efficiency of the battery in peace and in war. Nor is it sufficient that he should be well versed in stable management, or the ordinary routine of his official duties. He should be well acquainted with the matériel with which he has to deal, and he should be a practical gunner. But beyond this he should be versed in the larger tactics of his own arm, and not merely in its minor tactics. Lastly he should understand the tactics of the other arms in order that he may have an intelligent appreciation of what is required of artillery in modern warfare. It would be superfluous to allude to the necessity for a thorough

knowledge of all that relates to the comfort and efficiency of both men and horses. In the British Service the 2nd in command is a captain, who may at any time be called upon to take the place of the major, and this sufficiently indicates his role. The organisation into 3 divisions of 2 guns etc. each, Right, centre and Left, permits each division to be in-charge of a subaltern officer. These are responsible for everything connected with their divisions, men, horses, guns, carriages, ammunition, stores etc., and to everything that relates to these they are expected to give minute and personal attention. Each division again consists of 2 sub-divisions, and at the head of each is the No. I of the gun detachment, usually a sergeant, and these are immediately responsible to their divisional officers for the sub-divisions. The No. I, is technically the head of the gun detachment of 9 gunners and his duties are to lay and command the gun in the field. For the precise duties of officers and non-commissioned officers of artillery the reader is referred to the standing orders of the Royal Regiment of artillery, and to the *Hand-book for Field Service*. It seems to be a matter for question whether we do not in the artillery as in other branches of the service, require too much barrack work and stable duty from our officers. All details must be known and studied before we can mount higher in military knowledge, but it is not such apparent wisdom to require a daily routine of details which it is possible for a non-commissioned officers to perform. Continental officers of artillery and cavalry remark that we turn on officers into grooms, though we may not improperly rejoin that it would be better if the critics were more so, as it is acknowledged that no artillery in the world can compare to ours in horse-efficiency and stable management.

But as in other things perhaps we over do it, and it is not clear that a little less inspection of barracks and men's meals etc. might not conduce to the comfort of the men and the increased efficiency and knowledge of the officers. One thing is quite certain that a large amount of daily routine, and which can be performed by a less educated man, is in the course of years destructive of a desire to progress in military knowledge of a higher kind, and it is not uncommon to see that even those who are known as "good regimental officers" fail to rise above the criterion of the barrackyard.

Field Artillery, though now its transport is the horse, has been carried on elephants in India in mountain warfare, and cradles, or saddles are kept up so as to permit field guns and ammunition being transported in the mountainous frontier country of India.

Another method of transport of field guns is by *sleighs*, as used in Canada. The sleigh is a platform placed on runners 16" high and 3' broad. A description of the sleigh carriages and the exercise with them is given in the *Hand-book for Field Service*.

POSITION BATTERIES.—The *materiel* has been spoken of under the head B. Technical-Field. No position batteries are maintained in England and there is no peace establishment of men, horses, &c. The

matériel is kept in store and 140 40 prs. fully equipped are always in readiness and the war establishment would be as follows, though modification would be made as the 40 pr. B. L. gun would be replaced by an M. L. R. gun, probably the 40 pr. M. L. R. 4 guns and carriages, 4 ammunition wagons, 1 forge, 1 G. S., 1 platform, 1 store wagon, 1 store cart, carrying 40 rounds of ammunition per gun, and 160 per battery.

The *personnel* would be furnished from the garrison artillery, and the war establishment would probably be that of a garrison battery increased by the supply of drivers from the field artillery. The *transport* is by horses harnessed 4 abreast, and as it is intended that the horses etc. shall be furnished from the country if possible, the batteries have been specially fitted for the attachment of farmers' horses.

In India position batteries are maintained under the title of "Heavy (Field) Batteries." There are four in the whole of India, and the armament is of two kinds, Rifled and S. B., though the latter will be replaced by rifled guns. Two are stationed in Bengal, one in Madras and one in Bombay. The two first have each 3 40 prs. B. L. R. guns, 2 8 inch and 2 5½ in. mortars with 24 ammunition and other wagons.

The remaining batteries have 2 18 pr. S. B. guns, 1 8 in. howitzer, 2 8 inch and 2 5½ in. mortars, and 24 wagons etc., but these will be gradually replaced by the rifled guns, and the number of batteries perhaps somewhat reduced. The rifled batteries carry 830 rounds of ammunition and the S. B. batteries 932.

The *personnel* consists of 5 officers, 13 non-commissioned officers, 74 gunners and trumpeters, and a native establishment of 225 lascars, drivers, elephant drivers (mahouts) artificers etc., besides a Medical and Field Hospital Establishment of 14.

The *transport* is peculiar. Two elephants are used for each gun and howitzer, one in the shaft and the other as leader. Elephants are dangerous under fire, and therefore their place is taken by bullocks, of which 10 pair are required for a gun and 8 pair for a howitzer.

Bullocks are also employed for the draught of the wagons, and the driver sits on the yoke and guides them by a rope passed through the nostril. Elephants are especially valuable in heavy or sandy country, and in getting big guns across narrow ravines. Its pace is about 3½ miles an hour. Bullocks stand an immense deal of fatigue, and are especially valuable in wet and swampy ground. A detail of the harness &c. and stores for Elephant Batteries is given in the *Hand-book for Field Service* to which the reader is referred.

(e.) Siege Artillery—There is no special organisation of Siege Artillery in England in time of peace. The matériel is kept in store and the personnel and transport are furnished according to the requirements of the particular service. The new M. L. R. wrought iron guns

40 and 64 pounders of 35 and 64 cwt. respectively, will probably form part of any future siege train and with these will be associated 10" and 8" M. L. R. howitzers and 5½ inch and 10" mortars or perhaps a rifled mortar. The personnel would be supplied from the garrison artillery a battery of which at war strength would form a siege train battery. The transport might be specially furnished or supplied from the country in which the operations were to be conducted.

The proportion of guns etc. in a British Siege-train would be approximately :

55	64	M. L. R. Guns.
20	40	pounder do. do.
30		8" M. L. R. howitzers.

105

To these would probably be added rifled and smooth bore mortars according to circumstances.

The proportion of ammunition must vary with the nature of the siege, but as a standard a detail has been fixed which is given at length in the Revised Army Regulations 1870.

The number of men required is calculated for 3 reliefs with a reserve, so that allowing 10 men per gun, 5 per large and 3 for small mortars, we should have :

30	men per gun.
15	large mortar.
6	small do.

A Brigade of Garrison Artillery on a war strength is held to be sufficient to man a siege train of 35 pieces.

For this train, transport is necessary to take the guns etc. from the place of disembarkation whether from rail or ship, and also to supply the siege batteries and replenish ammunition from the parks.

The *Brigade* would consist of 8 batteries and be composed as follows :

Officers	51.
Non-Commissioned Officers	118.
Gunners	800.
Trumpeters	17.
<hr/>	
Total	986.

At Sevastopol the field artillery was rendered inefficient from the heavy calls made upon it for horses for the siege train, and it should be

therefore a matter for forethought and consideration as to how the transport for siege trains is to be provided. The duties of the siege trains, the position of parks and batteries, etc. rather relate to the conduct of sieges and will be found under that heading.

In India Siege Trains are kept in readiness in arsenals, and the transport which is composed of bullocks is to a large extent also maintained. These siege trains have been hitherto composed of S. B. 24 pr. and 18 pr. guns, 10 and 8 in. howitzers, and 10, 8, and 5½ in. mortars, but these will be replaced by rifled guns probably by the 64 pr. M. L. R. (converted 24 pr.) and by the 40 pr. M. L. R. guns with rifled howitzers.

There are 5 such siege trains in Bengal, 7 in Madras, and 6 in Bombay, (including 4 in reserve) with giving a total of 18 trains with 400 to 500 pieces. Should circumstances arise for these siege trains to take the field, the garrison artillery, and the native establishment in arsenals would have to supply the personnel, but it would be impossible for the garrison artillery in that country to supply men for all the siege trains, a contingency which has perhaps been put among the category of remote improbabilities. That we somewhat neglect careful organisation in this respect, or even that study and forethought which is necessary to a quick and efficient organisation on an emergency, is scarcely to be denied. The military history of British India shows that we have often attacked strong places with insufficient means, and the loss and delay which occurred should be for our future guide and warning rather than that we should take exaggerated credit to ourselves for ultimate success against an Eastern foe.

Garrison Artillery.

The garrison battery consists only of *personnel*, the matériel used being part of defences or fortress in which this branch of the artillery is employed. The peace establishment is not a fixed quantity. It varies and correctly so, with the circumstances of the employment of the battery, whether on, or next for foreign service etc. and another variable quantity is also involved, the financial requirements of the day. The establishment however may be taken to be as follows :

	Peace	War
Officers	... 4	... 4
Non-Commissioned officers	16	16
Gunners and } Trumpeters }	... 80-120	... 142

The employment of the garrison artillery in fortresses etc. is a most responsible and arduous duty, as upon them devolves the care and preservation of the ordnance, with all the complicated appliances and scientific constructions of modern artillery matériel, and the carriages, stores and ammunition, in addition to the numerous duties which belong to the defence of the place.

In India a garrison battery consists of 5 officers, 16 non-commissioned officers, 72 gunners and trumpeters, 13 subordinate medical, and field hospital establishment, and 17 native followers.

Garrison artillery are armed with the rifled carbine of the infantry pattern, and the sword bayonet.

Having thus treated of the units of organisation we shall endeavour to show how the units are formed, combined and worked. The rise and development of the Royal and Indian artilleries have been traced under the Section A. Historical. The Royal Regiment of artillery consists of 1397 officers borne on four lists : (1 the old R. A., 2 Bengal Artillery, 3 Madras, 4 Bombay. As the Indian cadres are absorbed, the old R. A. will form the " general list." In each cadre or list the officers are borne on a seniority roll, promotion being entirely by seniority) ; 33,367 non-commissioned officers and men, distributed in 217 batteries of horse, field, and garrison artillery. For purposes of administration a unit higher than the battery is adopted, called the *Brigade*. Each Brigade has its own Staff of Colonel-Commandant, 2 Colonels, 3 Lieutenant-Colonels, Adjutant, Riding-Master, Quarter-Master, and a Non-Commissioned Staff. The first named officer is not in active command, but the appointment corresponds to the colonelcy of a regiment.

The batteries of the brigades are as far as possible kept in the same part of the country in which the Head Quarters of the Brigade may be serving. The Horse Artillery consists of 5 brigades, 3 of which composed of 5 batteries each, are stationed in India, and the remaining two of 8 batteries each are in the United Kingdom, so that with 2 dépôt batteries we have 33 horse batteries, giving 198 guns. The horse artillery is so far a special branch, in that the officers are in a manner selected from the other branches of the artillery, and the men are enlisted for that particular service alone. On promotion, however, an officer leaves the horse artillery though he is eligible for appointment again as vacancies occur.

The Field Artillery is composed of 10 Brigades with a total of 83 batteries besides 3 dépôt batteries. The four brigades in England have each 10 batteries, the remaining 6 brigades are in India, and each has usually 7 or 8 batteries only. Each brigade is complete in staff as described for the horse artillery.

The Garrison Artillery consists of 13 brigades with a total of 114 batteries and 7 dépôt batteries ; 5 brigades are in England, 4 in the colonies and Mediterranean, and 4 in India. Each brigade has its own staff etc. and usually consists of 7 batteries. The coast brigade is a special brigade composed of officers promoted from the ranks, artillery men who have previously served in the more active branch. It is distributed among the batteries and forts on the coasts of the United Kingdom. But besides this organisation there is another, which may be termed the territorial system, or district commands. Each district

has at its head a Colonel on the Staff or merely a Colonel or officer, commanding the artillery district which corresponds to the districts of the army in general.

In India also, these artillery districts correspond to the army divisions and districts, and this officer exercises authority over all the artillery and armaments etc. in his district. The district commander may also be the Brigade commander, but it seldom happens that a district only contains the batteries of one brigade.

In the United Kingdom there are also artillery sub-districts, and a lieutenant-colonel is placed in each and invested with the command of the auxiliary and reserve force artillery of the sub-district. Thus it will be seen that there are two systems of administration of combinations of batteries : the Brigade and the District. The first may be said to be in regard to personnel, and the second would appear to embrace the local or territorial duties, there can be little doubt however, but that these pass the one into the other and that no hard and fast line can be drawn between them. The intermediate combination sometimes takes place when 2 field batteries are stationed together ; in this case this is called a Division of Artillery and is placed under a lieutenant-colonel who is allowed an adjutant. Woolwich is no longer the Official Head Quarters of the Artillery, but although the head-quarters of the different administrative units, now the brigade, formerly battalion, are no longer there concentrated, it must always be, so long as it exists as the chief artillery station, practically the station to which officers and men look as their head-quarters. It contains most of the great artillery establishments both of construction and instruction, and a large portion of the dépôt brigade is always there.

The highest administration of the Royal Artillery is conducted at the War Office in the Horse Guard's department. The general discipline and training of the artillery is under the Adjutant General of the Forces, while in the special artillery subjects, a principal staff officer, the Deputy-Adjutant-General of artillery with assistants, administers the interior economy of the Royal Artillery, and advises the Officer Commanding-in-Chief on matters connected with the promotion and distribution of officers. An Inspector-General of artillery is charged with special artillery inspections in the United Kingdom, and also inspects the matériel and munitions of war in the hands of the artillery. The Department of the Director of artillery and stores at the War Office, is a branch of the control or supply department, and deals with all matters relating to armaments, stores, and munitions, not in artillery charge, the introduction of new matériel, superintends the manufacture of warlike stores, and the scientific experiments which have to be constantly made. In India the administration is not dissimilar. A deputy Adjutant General of artillery forms part of the Adjutant General's department at the head-quarters of the army. An Inspector General has duties analogous to those of the similar official in England, while the Director of Artillery is represented in India by an Inspector General.

of Ordnance and Magazines who deals with all scientific artillery questions, armaments, and stores and matériel in charge of the Ordnance Department, as apart from those with the artillery, and advises the Supreme Government of India in these matters.

In addition to the artillery manufacturing departments in England and India, we have various instructional departments for the training of officers and men. These are :

1. *Royal Military Academy, Woolwich*, where cadets are instructed and prepared for the Royal Artillery, and Royal Engineers. The entrance to this institution is by open competition, and the experience of some years, has shown, that neither of the scientific corps has degenerated in either social qualities or in those professional attributes which have so long characterised the British Artillery Officer. The course of study usually lasts about $2\frac{1}{2}$ years and is in the following subjects:—Mathematics, field and permanent fortification, artillery, military drawing, field sketching and reconnaissance, military history and geography, French or German, chemistry and physics, drills and exercises, as manual, platoon, company drill, gymnastics, riding and sword exercise and artillery drills. The age of entry is from 16 to 18 and the entrance examination is one of a high standard in general subjects, including mathematics, classics, and languages. The “gentlemen cadets” are in 1 company under a major and 4 lieutenants.

2. The *Department of Artillery Studies*, Woolwich, is for advanced scientific instruction, and for the instruction of young officers who are commissioned in the Royal Artillery.

3. The *School of Gunnery* at Shoeburyness has a European reputation for excellence, and is a most important, and practical establishment. It is at this institution that officers and men receive first class theoretical and practical instruction, in the varied work of artillermen, while the experimental branch is charged with the conduct and record of the experiments in guns, and matériel, which are so necessarily frequent in a progressive science like that of artillery.

4. The *Riding Establishment* at Woolwich is the school of equitation for cadets, officers, and men of the artillery.

II.

NOTES ON TURKEY IN ASIA.

CONTENTS.

Boundaries and Provinces	...	...	...	...	...	...	...
Seaports	...	...	...	...	...	...	...
Principal Inland Towns	...	...	...	...	...	...	...
Roads	...	...	...	...	...	...	...
Railroads	...	...	...	...	...	...	...
Nationalities	...	...	...	...	...	...	...
Neighbouring Nations	...	...	...	...	...	...	...
Population	...	...	...	...	...	...	...
Army	...	...	...	...	...	...	...
Climate	...	...	...	...	...	...	...
Diseases	...	...	...	...	...	...	...
Currency	...	...	...	...	...	...	...
Camels, Horses, Cattle, &c.	...	...	...	...	...	...	...
Aptitude of the Turks for Defence	...	...	...	...	...	...	...

1877.

"I believe you will find that the men who are watching affairs in the East most keenly, because upon the issue of the Eastern question depends their national existence (I mean the statesmen and strategists of Austria) hold the opinion that we shall some day have to fight for our Indian Empire, not in Hindostan, but in the Valley of the Euphrates and on the plains of Mesopotamia,"

(Lecture by Captain C. B. Brudenbury, R. A., at the Royal United Service Institution in 1872.)

TURKEY IN ASIA.

**BOUNDARIES
& PROVINCES.****BOUNDARIES AND PROVINCES.**

- (1.) Turkey in Asia is bounded on the North by the Black Sea and a part of the Russian territory ; on the South by the deserts of Arabia ; on the East by Persia, and Russian Armenia ; and on the West by the Mediterranean Sea, the Archipelago, the Dardanelles, the Sea of Marmora, and the Bosphorus. It consists of :—

Anatolia.
Karamania.
Armenia.
Kurdistan.
El Jesireh or Mesopotamia.
Irak Arab.
Syria.

- (4.) But there is nothing definite in the territorial distribution of the various parts of the Turkish dominions. Whole provinces and departments are subject to frequent changes. Some times one province absorbs another, or the limits of one encroach on the limits of the other ; while on the Persian frontier large districts are pulled one way by Turkish and another by Persian pretenders. We may therefore consider the country according to its natural divisions which are four namely :—

- (1. (a.) *Anatolia*, or the peninsula of Asia Minor, situate between the Black Sea and the Levant.
- (b.) *Armenia and Kurdistan*, or the table land to the North East.
- (c.) *Assyria, Babylonia, and Mesopotamia*, or the low countries of *Turkish Arabia*.
- (d.) *Syria*, including Palestine.

Anatolia.

- (5.) **ANATOLIA**, or the Peninsula of Asia Minor, consists of a great table-land, which, starting westward from the Asiatic continent at an average elevation of nearly 4000 feet above the sea, advances towards the Ægean, diminishing in height to about 2000 feet. This plateau nowhere comes abruptly to the sea, but ere it reaches it, whether on the North, the West, or the South its sides are broken into abrupt and fantastic shapes. It must not be imagined however that this plateau is all

one smooth unbroken platform ; its surface has been rendered rough and irregular by the erosion of flowing rivers, and still more by the upheaval of chains of mountains. There are extensive districts in different portions of the country which are covered with fine and heavy forests. These are well-watered. But in extensive tracts where the original forests have been destroyed, and the soil, no longer sustained by their roots, has been carried down into the plains, leaving the mountain a barren rock, the rain which falls abundantly in winter creates only rapid and ephemeral torrents and the supply of water becomes very limited. The forests are mostly to the North.

The chief rivers of Anatolia are those which fall into (2.) the Black Sea, the Kizil Irmak, which has a length of about 700 miles, only partly navigable, and the Sakaria, which waters the little district which was the first home (12.) of the now extensive Ottoman Empire.

The principal products are wool, Mohair (from Angora), (6.) silk (from Broussa), cotton (from Smyrna), madder, opium, dried fruits, carpets, &c. The corn and barley are of the best quality. The pasture is good.

ARMENIA AND KURDISTAN. Most of Asia Minor, *Armenia and (7.) Kurdistan.* the whole of Armenia, and part of Persia is a high table-land, diversified by mountains. The mountain range of Taurus, commencing at the South-west corner of Asia Minor, bounds the great table-land on the South, running parallel with the shore at the distance of 60 or 70 miles as far the Pylæ Ciliciæ near Tarsus, and then proceeding in a direction decidedly North of East to the neighbourhood of Lake Van, where it unites with the line of Zagros. In Asia Minor the highest of the Taurus peaks are 9 or 10,000 feet. About Lake Van the highest are 11 or 12,000. At the opposite side of the table-land bounding it towards the North, there runs, under various names, a second continuous range of inferior elevation, which begins near Brusa and proceeds in a line nearly parallel with the Northern coast to the vicinity of Kars. Between this and Taurus are two other important ridges which run westward from the neighbourhood of Ararat to about the 34th degree of east longitude, after which they subside into the plain. The heart of the mountain region, the tract extending from the district of Eriwan on the East to the upper course of the Kizil Irmak river and the vicinity of Sivas upon the West is Armenia, a country of lofty

ridges, deep and narrow valleys, numerous and copious streams, and occasional broad plains,—a country of rich pasture grounds, productive orchards, and abundant harvests. To the North of the table-land is a narrow strip of land, in breadth from 40 to 100 miles, consisting of wooded spurs from the Northern mountain chain, with valleys of greater or less width between them.

- (2.) From Armenia spring most of the great rivers of Asiatic Turkey, the Kizil Irmak, which has already been mentioned as flowing through Anatolia to the Black Sea, the Euphrates and Tigris which will be more fully noticed under the head of "Turkish Arabia," through which they flow to the Persian Gulf; the Arras flowing to the Caspian; and the Choruk which falls into the Black Sea a few miles South of Batoum.
- (7.) The river Arras rises from several sources in the mountain tract between Kars and Erzeroum, and flows with a very winding course in a direction generally East-ward, and passes round the North and East of Ararat. It is a considerable stream from its source. At Hassan Kaleh, less than 20 miles from Erzeroum where the river is forded in several branches, the water reaches the saddle-girths. In spring and early summer the stream receives enormous accessions from the spring rains and the melting of the snows, which produce floods that often cause great damage to the lands and villages along the valley. The length of the Arras, including only main windings is 500 miles.
- (4.) Koordistan is comprised from North to South between Mount Ararat and the frontiers of Georgia on one side, and the neighbourhood of Baghdad on the other, while from East to West its limits may be considered to be the Persian frontier and the borders of Asia Minor. Mount Ararat (17,000 feet) on the boundaries of Russian, Persian, and Turkish territories, is the highest Mountain in that part of Asia, and next comes Subhan-dagh, close to, and to the West of, Lake Van. Koordistan comprises the Sandjaks (districts) of Van, Bayazid, Hakkiari, and Mosul, all under the Pasha or Governor General of Erzeroum.
- (1) Northern Koordistan is almost wholly occupied by mountain ranges running nearly parallel from North-West to South-East. The Soli chain stretches from the city of Jezireh near the Tigris, right across the country to the Persian frontier. It is low at first, not rising higher than 1000 feet. In the middle of its

course, where it takes the name of Elkhair, it reaches the height of 3000 feet and continues to rise till it reaches the confines of Persia. Between this ridge and the Armenian frontier is the lofty plateau of Alitagh varying from 4000 to 7000 feet in height and intersected at rare intervals with valleys. During the scorching heats of summer the shepherds drive their flocks from the low grounds to this table-land, which affords a scanty pasture. Between the El Khair mountains and the Persian frontier the mountains rise higher and the valleys though still very narrow, become deeper. The Southern portion of Koordistan possesses large tracts of low and level lands. Three ranges of low hills diversify the surface, but only on the side of Persia can it be considered mountainous. These ranges are the Kara tagh on the North East ; Ali tagh in the centre ; and the Hamrin hills on the South-West.

The principal rivers in Kurdistan are the Great Zab, Lesser Zab, and Diyaleh. The first of these, rising in the Ali tagh, drains a great part of Koordistan, and flowing past the Karatagh, falls into the Tigris a little way below Mosul. The Lesser Zab rises on the borders Southern Kurdistan and Persia, and, flowing in a course nearly parallel with the Great Zab, joins the Tigris about 50 miles further down. The Diyaleh falls into the Tigris about 30 miles from Baghdad.

Bears, wild boars, goats, and deer abound in the forests of Kurdistan, but birds, except partridges and quails are scarce, wheat, barley, rice, cotton, and tobacco, (8.) are grown. Kerkook is the mart to which these productions are carried.

TURKISH ARABIA. The province of Turkish Arabia is composed entirely of alluvium deposited by the great rivers Tigris and Euphrates and their tributaries in the space between the mountain lime stone ranges of Persia on the North and the desert of Arabia on the South. With the exception of some marshes, a few recent canals, and the rivers with a little vegetation fringing their banks, the whole of this space, 80,000 square miles is a bare plain traced with the remains of a network of canals; and mounds, the remains of towns and villages. In early times the fertility of Mesopotamia was carried to its utmost limit by means of these canals with which the country was everywhere intersected and some of the largest of which were navigable. These excited the wonder and interest of Alexander the Great, who after his return from the conquest of India, examined them

Turkish Arabia. (9.)

personally and employed a great number of men to repair them.

(11.) Xenophon in his Anabasis mentions that Cyrus when attacking Artaxerxes found the land between the Tigris and Euphrates divided into parallelograms by the wall of Media and 4 Ship canals running across from one river to the other.

(7.) The chief geographical features of Turkish Arabia are its rivers. Of these the principal are the Tigris and Euphrates, which rise from opposite sides of the same mountain chain, the loftiest of the many parallel-ridges which intervene between the Euxine and the Mesopotamian plain and the only one which transcends in many places the limits of perpetual snow. The Euphrates flows Westward from its source near Ararat, passes within a few miles of the source of the Tigris, forces a way through the mountains towards the South pursues a tortuous course but ultimately bends round to a South Easterly direction and joins with the Tigris, to form the Shut'l Arab. The Tigris begins by flowing in an Easterly direction, but gradually comes round to the South-East and converges on the Euphrates with which it unites about 150 miles from the head of the Persian Gulf. The estimated length of the Tigris is 1200 miles ; that of the Euphrates is about half as much again. The Tigris is navigable for upwards of 1000 miles of its course, the Euphrates for about 1200 miles. Small steamers have been used on the Tigris from Mosul downwards ; on the Euphrates from Bir downwards. The Tigris is largely enriched throughout the whole of its course by the waters of tributary streams. It is formed originally of three main branches, and as it proceeds it is continually receiving from the left a series of most important additions ; the principal of which are the Eastern Khaboor, the upper Zab, which falls in below the ruins of Nineveh ; the lower Zab and Adhem, which fall in between that and Baghdad ; and the Diyaleh which is received a little below Baghdad. Owing to the lie of the land which slopes from North-East to North-West the Tigris catches as it were all the streams from the mountains away to its left and prevents the Euphrates from getting any. Consequently, though the latter river has no lack of petty affluents so long as it runs among the Armenian mountains, yet after it enters on the low country, it only receives the Belik and the Khaboor on that side, and for the last 800 miles of its course it does not receive a single tributary. On the contrary it throws out branches

which either terminate in marshes or else empty themselves into the Tigris. The same reason, the lie of the land, prevents the Tigris from having tributaries on its right, and causes the Euphrates, which has low banks, to flow off into marshes to the right. So much do these marshes absorb that it is said that except in the flood time very little of the Euphrates water reaches the sea. The melting of the snow in the mountains causes these rivers to rise in spring. The flood season of the Tigris is from early in March to the middle of June, that of the Euphrates from March to September. The soil of Turkish Arabia is fertile, producing rice, dates, and grains of different kinds. There are numerous palm trees by the banks of the rivers, but elsewhere the country has little wood.

The region to the North and East of Turkish Arabia is one of great strength and at the same time of great productiveness and fertility. Both to North and to East there are a number of parallel mountain ranges, with deep valleys between them, watered by great rivers or their affluents. In both directions the mountains ascend considerably above the snow-line, often reaching the elevation of 10,000 feet. To the North the mountains run from a little North of East to a little South of West. To the East they run from North-West to South-East. Thus the axes of the two chains are nearly at right angles to one another, the triangular basin of Van occurring at the point of contact and softening the abruptness of the transition. The valleys to the North are perhaps more fertile and the hills more wooded than to the East, but in both countries a numerous population may find subsistence. To the North the mountains ascend at once to their full height from the level of the Tigris, and the ridges (of which there are 6 or 7—the passes over some being only open for 7 months of the year) then gradually decline towards the Euxine. To the East the mountains present their gradual slope to the Mesopotamian lowland and rise in higher and higher ridges as they recede from it.

SYRIA. Northern Syria is not a tract of much value. Towards the North it is mountainous consisting of spurs from Amanus and Taurus which gradually subside into the desert a little to the South of Aleppo. West and South-West of this region, between it and the Mediterranean lies Syria Proper. Here two parallel ranges of mountains, Libanus and Anti-libanus, inter-

Syria.

vene between the coast and the desert and are prolific parents of a numerous progeny of small streams. To the West of Libanus is a belt of sandy land along the sea where palm-groves flourish ; an uplandgrain region ; and the higher and well wooded slopes of the hills. To the East of Anti-libanus is the Pashalic of Damascus, a perfect garden of fertility. South of this comes Palestine, a high region cut in two by the deep valley of the Jordan. Further South is Idumaea, a bare but cultivable district.

SEA-PORTS.**SEA-PORTS.**

- (6.) The harbours of Asiatic Turkey, like its roads, are as a rule pretty much as nature made them. There are numerous roadsteads on the South side of the Black Sea, but not one really good harbour.

- Batoum.* (2.) BATOUM is the only safe port on the coast in winter. It is a large and well-sheltered harbour, but the place is unhealthy from July to October.

- Trebizonde.* (5.) TREBIZONDE is the only harbour on the North not subject to fever. It was at Trebizonde that the retreat of the 10,000 Greeks from Babylon to the Euxine came to a close, and it was on the hills above that those Greeks, coming in sight of the Sea, raised the shout of " Thalatta, thalatta" (" The Sea, the Sea")—an incident which has so struck the fancy of the world that their shout on that occasion has become a household word for subsequent ages. Trebizond stands upon (20.) a rocky table-land (deriving its name from Trapeza—a table). There is no harbour and a rolling Sea comes in which looks, and must be, dangerous. The citadel is a large space of ruinous buildings, surrounded by romantic walls and towers. Trebizond is not defensible by land or Sea, nor could it be made so from the land side, as it is commanded by the sloping hills immediately behind it. From there being no bay or harbour its approach is dangerous during the prevalence (2.) of North winds. A small open bay is the anchorage in summer and the roadstead of Platana, seven miles to the West, in winter. Trebizond is the port of Erzernum, Tabreez, and Teheran, and the chief entrepot between Central Asia and Europe, and a most important place. The river Deyermendereh falls into the Black Sea near this. It is easily fordable at all points for ten months in the year but is flooded in spring.

- Samsun.* (5.) SAMSUN is much exposed to the North and East

It is surrounded by swamps and very unhealthy. The fever season begins in July, but is worst in October. The port is capable of being made one of the best in the Black Sea ; but to render it safe and commodious engineering works of a rather formidable character would be necessary. Samsun is the outlet of a vast (13.) tract of fertile country, the Sea-port of Kharpoott, Diarbekir, and a great part of Asia Minor ; but it is cursed by a most deadly climate.

SMYRNA, the chief port of Anatolia, and the second (6.) *Smyrna*. city of the Ottoman empire, is at the head of a bay, which affords excellent anchorage, though considerable (5.) encroachments have been made upon it by deposits from the river Hermus.

ALEXANDRETTA, or Scanderoon, is a fine natural (6.) *Alexandretta*. harbour, easily made at all times, but rather exposed to (5.) the West and South. It is the port of Aleppo which (14.) is about 100 miles distant and shut off from the coast by a range of high hills. From the shore up to the foot of the hills there is a belt of low level marshy ground, very suggestive of fever and discomfort. The town itself is a wretched little place.

BEYROUT, the principal maritime outlet of Syria, is (6.) *Beyrouth*. simply an open roadstead from which ships have frequently to run for shelter. It is connected with Damascus by a fine carriage road, about 70 miles in length, which crosses Lebanon and Antilebanon, by easy gradients, at the respective elevations of 6000 and 4000 feet.

JAFFA, the Southernmost port of Syria, is protected *Jaffa*. by a natural break-water, but there has been so much silting within this that all vessels larger than mere coasting craft have to anchor in the roadstead.

BUSSORAH is the chief Turkish port towards the (14.) *Bussorah*. Eastern Seas. It is situated on the right bank of the Shut'l Arab [the name given to the river formed by the junction of the Euphrates (or Frât) and Tigris (or Dijilla)]. The country about the head of the Persian Gulf is so low that there is often a difficulty in finding the river mouth, though there are buoys some distance out at sea to mark it. Bussorah is about 80 miles up the river and is built on a creek about $1\frac{1}{2}$ miles away from the main stream.

INLAND TOWNS.

INLAND TOWNS. The principal inland towns are as follows :—

- In Anatolia.* (12.) IN ANATOLIA. BRUSA, the original capital of the Ottoman empire. Sivas about 150 miles South of Sam-sun. And *Angora*, famous for goats hair. Angora as seen from the East presents the appearance of a long and narrow hill, whose flat summit is covered with walls and towers. This hill slopes down on all sides except the North, where it is precipitous, with the river passing at the foot of the cliffs, embowered in leafy verdure. The town spreads to the greatest distance on the Western side.
- In Armenia and Koordistan.* IN ARMEANIA AND KOORDISTAN are Ardahan, Bayazid, Kars, Erzeroum, Van, and Diarbekir.
- (15.) ARDAHAN is the Turkish post opposite the Russian fort of Akhiska.
- (2.)(16.)(17.) BAYAZID is opposite the Russian post of Eriwan. It is defended by a loop-holed wall flanked with towers. It has a population of 8 or 10,000, mostly Armenians. The houses are built on broken ground, the different quarters being separated by ravines. The place has always fallen after slight resistance ; even the citadel, which is on a rock, is incapable of resisting Artillery.
- (18.) KARS is the key of Asiatic Turkey. It successfully resisted Nadir Shah in 1735 and the Russians in 1807. It was taken by the Russians under Paskiewitch in 1828. The city occupies the semi-circular bend made by the Karschai as it quits a narrow gorge of the Tchil-dir range. The Northern and principal portion of the fortress is protected by a ledge of bold and naturally scarped rocks, rising abruptly from the right bank of the river. The other 3 sides have a rough stone wall 4 or 5 feet thick and 12 to 24 feet high, flanked by square towers. A bastioned enceinte has been thrown up outside this wall as an additional defence. At the North-West angle of the town is the citadel Narin Kala composed of three separate castellated buildings, whose guns sweep the river both above and below the town of which this work is the principal defence. The suburbs of Osta Kapu extend Eastward from the Karschai along the Southern side of the town. To these an impracticable marsh succeeds, and again between this the hills of Karadagh is the remaining portion of suburbs called Bairam Pasha.

Houses extend almost to the walls of the fortress. The little river Karschai flows at the foot of the rock (15.) on which stands the citadel, and washes an eminence on the opposite side that is crowned by a ruin which dominates the former work. Kars is commanded by a ridge of hills, the largest of which, the Karadagh, overlooks the plain by which the enemy would have to advance in the event of an attack in force on Kars, but the town is liable to be turned by a rapid march over the hills, in which case the position of the Karadagh would offer little means of resistance. In 1854 General Guyon erected eight redoubts on the Karadagh for the defence of Kars.

The castle (citadel) is a most picturesque model of a (13.) feudal strong-hold. Built on a craggy rock, which rises abruptly at the entrance of a deep gully, it commands the whole city and its grey old walls seem to blend with the scarp rocks and precipices on which it is built. At the foot of its rocky foundations the Karschai, a brawling mountain river, crossed by an ancient stone bridge rushes over its strong bed. The population of Kars is about 20,000. In 1855 the Turkish garrison, about 17000 strong, with scarcely any cavalry, held out under General Williams of the Royal Artillery against a Russian Army of nearly 40,000, including 10,000 cavalry, for 5 months, amid incredible hardships. The blockade commenced on the 16th June, and, varied from time to time by skirmishes, and two attempts to gain possession of the detached forts, continued until all the Turkish Cavalry was destroyed and the garrison weakened for want of food, when a general assault was given on the 29th September. The Russians had calculated on taking the town by a *coup de main* in the early morning, but were foiled by the vigilance of the garrison. After a desperate engagement which lasted 7½ hours the Turks were left masters of the field. The Russians acknowledged the loss of 6300 men in this attack. On account of the utter want of Cavalry, and the weakness, both physical and numerical of the Turkish Army, the Russians, having retired from the assault, were still able by means of their numerous un-touched Cavalry to resume the blockade. The garrison was obliged at length to capitulate to their vanquished enemy, after having gone through such frightful sufferings that scarce two thirds of the original numbers remained, and many of these expired after the surrender on the 28th November, 1855. By the treaty of 1856 Kars was restored to the Turks.

- (20.) ERZEROUM is situated in an extensive elevated plateau, about 30 miles long and about 10 wide, between 7 and 8,000 feet above the level of the Sea. It is surrounded by lofty mountains, many of them covered with eternal snow. The city is said to contain between 30 and 40,000 inhabitants. It stands on a small hill, or several hills, at the foot of a mountain called Deve dagh, the Camel mountain. The original city is nearly a square and is surrounded with a double wall with peculiarly shaped towers, a sort of pentagon, about 20 towers on each side, except on the South side, where a great part of the walls have fallen down. Within these walls, on an elevated mound, is the smaller square of the citadel. A ditch, where it is not filled up with rubbish and neglect surrounds the walls of the city and beyond this are the suburbs where the greater part of the population reside. The winter at
- (17.) Erzeroum lasts about eight months. Hay in summer is abundant if got in before the snow comes. Fuel is
- (2.) very scarce. Water is brought into the town by wooden pipes from the neighbouring hill, Polanduken.
- (4.) VAN. Kars to the North and Van to the East are the two bulwarks of the Ottoman empire in Asia. The fortress of Van is situated on the top of a rock 250 feet high on the Eastern shore of the lake of the same name.
- (7.) Lake Van is situated at an elevation of 5400 feet above the sea level. It is a triangular basin of which the three sides front respectively S. S. E., N. N. E., and N. W. by W. The lake is embosomed amid high mountains reaching the level of perpetual snow. It is fed by a number of small streams, and having no outlet, is salt. The basin of Lake Van, surrounded by high ranges and forming the very heart of the mountain system of this part of Asia, is an isolated region, a sort of natural citadel, where a strong military power would be likely to establish itself. The climate is mild compared with that of the adjacent districts. The thermometer seldom falls to 14° Fahr. or rises above 90°. Wheat and barley are plentiful.
- (4.) For 3000 yards all round Van the ground is perfectly level. On the Northern side little hills begin to rise at that distance, but are commanded by the batteries on the rock. This however is the weak point, chiefly owing to the want of a lower line of batteries and of advanced works. The ridge of the rock runs East and West, falling abruptly at either end. The walls of the fortress follow this precipitous descent and join the fortifications surrounding the town, which lies below

and to the South. There are three gates, the East or Tabreez gate, West or Stambol gate, and South or middle gate. There is one main street from East to West, the rest are crooked lanes. The Western part of the town is almost entirely deserted and in ruins. One great advantage is possessed by this fortress, its communications with the lake ; and therefore with the countries surrounding it, cannot be cut off. The population of Van is 14,000, viz., 8,000 Armenians and 6,000 Mussalmans of Koordish and Turkish blood, but the town itself is chiefly used as a place of business while the people live in the suburbs, which, commencing about 600 or 700 yards from the glacis extend for about three miles out, mostly towards the East. Lake Van is 25 to 30 miles long and 9 to 12 broad. *Diarbekir* is (2.) a walled town built of black basaltic stone and (14.) situated on the right bank of the upper Tigris. The surrounding country is a wide grassy plain little cultivated or inhabited.

IN SYRIA are ALEPPO, a large well-built town, and *In Syria*. *Damascus*, one of the oldest cities in the world.

IN TURKISH ARABIA is *Baghdad*, the capital of that *In Turkish Arabia*. province and by far the largest town in it. It contains (9.) 70,000 Mahomedans, 2000 Christians, and 18,000 Jews, in all 90,000 inhabitants. Of the Mahomedans 63,000 are of Arab descent and 7000 are Turks, Persians, and Indians. Baghdad is about 250 miles in a direct line from Bussorah, but by river it is about (14.) 500 miles distant. The town is built on both banks of the river Tigris, here about $\frac{1}{2}$ of a mile in breadth. A bridge of boats connects the two parts. The view from the river presents no very striking features. The town has a dilapidated air about it. It has been so often visited by floods, earthquakes, and plagues, that its actual appearance does not equal its fame. The part of the town on the right bank of the river is unwalled. That on the left bank, which is the largest part, has walls, but they are (1869) in a very ruinous condition, and though guns were lying in some of the bastions, they were old and neglected. The Pasha of Baghdad ranks second among the Sultan's subjects, the Pasha of Egypt being first, and the Pasha of Erzeroom third.

ROADS.

ROADS.

There are few good roads in the country but some of the more important routes require notice. One of

Bughdad to Alexandretta.

(14.) the principal commercial routes is that from Baghdad, via Mosul, Diabekir, and Aleppo, to Alexandretta. For some little distance out of Baghdad there is a road, but it soon degenerates into a mere track, and for the rest of the way there is scarcely a mile of well made road. In some places attempts have been made to construct one, but the plan pursued is so peculiar that it is generally more convenient to ride along side the road than on it. The plan is to build three parallel stone walls—the centre one to mark the middle and the two others the sides of the proposed road—and then to throw large boulders in between the walls. Made in this way they can only be of use in very wet weather when it is impossible to drag through the mud at the road side, but just possible to stumble along the top of the boulders.

Kars to Erzeroum.

(6.) From a military point of view one of the chief roads is that which enters Kars from Russia, passes through to Erzeroum, and dividing thence, branches North to Trebizon, and in a Westerly direction to Tokat ; but these are at best mere bridle-tracks, carried sometimes through swamps and some times over mountain summits. A new road has recently been made from Trebizon to Erzeroum. Erzeroum may be considered as the centre from which numerous roads or tracks radiate. Besides the roads to Trebizon (159 miles), to Kars (108 miles) and to Tokat, already mentioned, there are roads to Van, via Lata, and to Baghdad via Mosul.

Trebizon to Erzeroum.

(6.) The road from Erzeroum to Kars lies across a succession of broad, dry, and healthy plains, through a corn growing country with streams of pure water at every step. Seven miles from Erzeroum there is a high ridge. Deveh-boinu, or the camel's neck, which is strategically a very important point, because, if the Turkish forces were to lose ground at Kars, this is the place where they could most effectually make a stand in defence of Erzeroum. As a defensive position it is unapproachable on the left flank and difficult on the right. It is an inhospitable, cold, and dreary spot, and uninhabited. The road from Erzeroum to Van branches off from that to Kars on the further or Eastern side of this ridge. The road from Erzeroum to Baghdad via Mosul is not always practicable in the winter.

Erzeroum to Van.

Erzeroum to Baghdad (2.)

Constantinople to Baghdad and to Aleppo.

Samsoun to Sivas.

The principal mail lines from Constantinople are to Baghdad by Sivas, Diarbekir, and Mosul ; and to Aleppo by Afium Karahissar, and Konieh ; the former is joined at Sivas by a military road from Samsoun via Amasia and Tokat.

There is a fine carriage road between Beyrouth and (6.) *Beyrouth to Damascus.* Damascus, a distance of about 70 miles.

The roads from Smyrna to the interior are at times *Smyrna to interior.* impassable. At the best they are suited for Camel transit only.

RAIL-ROADS.

RAIL-ROADS.

Smyrna is the terminus of two railways, that to (6.) & (2.) Aidin (80 miles in length) and that to Cassaba (63 miles). An extension of the latter to Scutari has been contemplated, if not commenced. This would unite the two chief cities of the empire—Constantinople and Smyrna.

NATIONALITIES.

NATIONALITIES.

THE TURKISH OR OSMANLI RACE has now become (5.) *Osmans.* a mixture of many races. It is indeed this fact that has saved them from the deteriorating effects of the vices in which they have indulged without restraint for five centuries past. Arabs, Georgians, Circassians, Persians, not to mention the races indigenous to the soil, have poured their best blood into the veins of the Osmanli race by supplying the harems of the grandees, and by conversion to Islamism.

Besides the Osmanlis the chief Mahomedan races (23.) are in the North the Turkmans, in the South the Arabs, in the West the Druses, and in the East the Koords.

THE TURKMANS are a nomadic race of Tartar descent. *Turkmans.* Their number is estimated at 85,000.

THE ARABS in the Sultan's dominions are estimated *Arabs.* at 889,000. They have nearly forsaken agriculture and have relapsed into a semi-nomadic condition.

THE DRUSES are a brave and warlike people, active *Druses.* in mind and body, intelligent, and capable of great things both in peace and war. Their number is said to be 80,000.

THE KOORDS are a warlike race. As a nation they *Koords.* must be looked on as being exclusively horsemen. But some of the mountaineers of Hakkiali (anti-taurus) are very good shots and would form a body of first-rate rifle-men. The Koords still retain national peculiarities of their own. They have a Koordish language, though it is not a written one; those of them who

write, use the Persian language. They belong to the Shiah branch of the Mahommedan religion, although their present masters, the Turks, are Sunnites. They have made three separate attempts to achieve independence in the present century. First in 1834, secondly in 1843, and lastly in 1847. The inhabitants of Koordistan consist of Koords ; Armenians ; Ottoman Turks, a designation assumed by many as being the name of the dominant race ; Nestorians ; Yezids, or worshippers of the devil ; and a few Jews.

THE KOORDS are good horsemen and their weapon is the lance.

Armenians.

THE ARMENIANS are distinguished by a bright intellect, a disposition to work, a great amount of forbearance, and frugal habits. Want of courage, dissimulation, and craft are their vices.

Nestorians.

THE NESTORIANS are a Christian sect, scattered over the country, but principally residing in the East of the Hakkari mountains. They amount to 200,000 souls and are a war-like people, specially strong in mountain warfare.

Yezids.

THE YEZIDS are worshippers of the devil. As a race they are very handsome. They are excellent horsemen and fight like devils.

Jews.

JEWS, while preserving their peculiar features, are apt to adopt almost everywhere the manners and customs of the country they reside in, and in Koordistan no peculiarity distinguishes them from the other races.

**NEIGHBOURING
NATIONS.**

NEIGHBOURING NATIONS.

Russia, Persia, and Arabia are the countries contiguous to Asiatic Turkey.

Russia.

- (21.) RUSSIA. Until 1801 the Caucasus formed the Southern boundary of Russia and the Turkish frontier was a very defensible one. Her actual frontier is far less well defined. Kars is now the most central and strategically important point and faces Alexandropol or (Gumri) a Russian fortress of great strength. On the right of the Turkish line is the town of Bayazid opposite Erivan, neither place being of any great strength. On the left the Turks have the port of Batoum opposite the Russian Poti, and Ardahan against
- (15.)

the strong town of Akhiska. In April 1854 the following troops were distributed in these posts:

Russian.	At and near Alexandropol 15,000	30,000.
" " "	Eriwan	3,000	
" " "	Urzughetti (near Poti) 8,000		
" " "	Akhiska	4,000	
Turkish.	At and near Kars	... 20,000	37,000.
" " "	Bayazid	2,000	
" " "	Batoum	2,000	
" " "	Ardahan	13,000	

Driven from their first line of defence the Turks have (17.) a second line to fall back on, in the Soganlook mountains. These are not free from snow till August. They are covered with pines and intersected by numerous ravines. They are crossed by the two main roads of Zavirm and Medginghert (besides minor paths). There is no cross-communication between the two passes except by a circuitous route.

PERSIA is for the most part a rugged and sterile (7.) *Persia*. country, apt to produce a brave and hardy race, but incapable of sustaining a large population. A strong barrier separates it from the great Mesopotamian lowland, and, by occupying a few easily defensible passes, Turkey could prevent a Persian Army from debouching on the plains. The regular road from Baghdad into Persia (9.) runs via Khanikin (on the frontier,) Kernianshah, and Hamadan to Teheran, but the Persian frontier actually extends to the left bank of the Shutl' Arab below (14.) Bussorah.

ARABIA. The frontier lies open on the side of *Arabia*. Arabia. Here however the nature of the country is (7.) such, that population must be always sparse, and the habits of the people are opposed to that political union which can alone make a race formidable to others. Once only in their history, under the excitement of a religious frenzy, have the Arabs issued forth from the great peninsula on an errand of conquest. In general they are content to vex and harass without seriously alarming their neighbours. Arabia as a conterminous power is troublesome, but rarely dangerous.

POPULATION.

POPULATION.

The population of Asiatic Turkey is estimated at (6.) 18 millions of whom about three-fourths are Mahomedans. In European Turkey only about one-fourth (2.) are Mahomedans.

ARMY.

Army. (22.) The army is composed of :—

The Standing Army or Nizam.

The Reserve or Ikdiat.

The Militia or Redif.

The National Guard or Mustafiz.

*Standing Army.
Reserve.*

The usual term of service in the *Nizam* is 4 years. The *Ikdiat* is formed of men who have served 4 years in the *Nizam* or have been discharged before completing that period. They are supposed to revert to their original corps on out-break of war.

Militia.

The *Redif* is composed of those who have escaped conscription and those who have completed 6 years service with the *Nizam* or *Ikdiat*. The period of service in the *Redif* is 6 years.

National Guard.

The *Mustafiz* is the very embodiment of theory. It has neither organization, nor arms, nor officers, nor cadres.

Troops in Asia.

Four of the Seven Corps d'armee of which the Army is composed are stationed in Asia, their head-quarters being at Erzeroum, Baghdad, Damascus, and Sanala (?). Each corps consists of :—

7 Regiments (28 battalions) of Infantry.

5 " (30 squadrons) of Cavalry.

1 " (84 guns) of Artillery.

with a theoretical strength of 27,000 men, which in war is supposed to be supplemented by 34 battalions of Redifs.

CLIMATE.

CLIMATE.

Anatolia.

(6.) Central *Anatolia* has a dry, bracing, and healthy climate, except in some of the deeper valleys where intermittent fever occasionally appears.

Kurdistan.

(1.) The climate of *Kurdistan* ranges between the extremes of heat and cold. In summer the heat is intense, especially in the South. In winter the cold to the North is quite unendurable. On many of the mountain tops, snow remains for 6 months of the year. At Erzeroum the summer, though very short, is hot and parching, the thermometer being usually 84° though it rises occasionally to 90°. The cold in winter is commonly 16° below

Zero and is often colder. The deep narrow valleys and ravines which slope down from the elevated plateau of Erzeroum are unhealthy and pestilential in the extreme, while the inhabitants of the upper country enjoy good health enough.

TURKISH ARABIA. The countries watered by the *Turkish Arabia*. Euphrates and Tigris may be distinguished, by their (1.) configuration, climate, and natural productions, into three zones. The *first* or most Northern comprises the mountainous country traversed by the ranges of Taurus, where the winters are cold and the summers hot, and where the productions are forest and fruit trees, olives, wine, corn, and pasturage. The *second* zone consists of stony or sandy plains, the fertile parts of which produce mulberry-trees, cotton, maize, sesame, tobacco, &c. The climate is characterized by great dryness, combined with great variations of temperature, and the zone comprises Northern Syria, Mesopotamia, and the low country to the East of the Upper Tigris. The *third* zone, which extends from Feluja (near Bagdad,) to the Persian Gulf, consists of low, watery, alluvial plains, which produce date trees, rice, and pasturage, or saline plants, reeds sedges, and rushes. The plain is intersected in every direction by the remains of ancient canals, and is still capable of that extensive irrigation which made it in ancient times the richest country in the world. But at present it is nearly a desert and cultivation is only found like a fringe along the banks of the rivers.

In Upper Mesopotamia, and the country between (7.) the Tigris and the mountains of Armenia and Kurdistan, the climate is at once cooler and moister than Lower Mesopotamia and the country near the head of the Persian Gulf. A good deal of rain falls in the winter and even in the spring ; while after the rains are past, there is frequently an abundant dew. In the more Northerly parts of this region (about Harian and Orfa) the heat in summer is great, while in winter much snow falls and usually lies for some weeks ; the range of the thermometer during the year reaches 120° or more. Trees are scanty, except along the river courses ; even grass fails after the first burst of spring ; and the plains which for a few weeks have been carpeted with the tenderest verdure and thickly strewn with the brightest and loveliest flowers, become, as the summer advances, yellow, parched, and almost herbless.

At *Bagdad* the thermometer in the shade often

rises to 120° and near the Persian Gulf the temperature in summer is still higher. In winter there is frost occasionally but the thermometer does not often sink below 30°. The rainy season is in the winter time. Heavy showers fall in November and still more in December, which sensibly raise the level of the rivers. As the spring advances the showers become lighter and less frequent, but they still recur from time to time, until the summer sets in about May. From May to November rain is very rare indeed.

- (9.) June, July, August and September are the hottest months, January is the coldest. December and January are the raniest. The average yearly rainfall is from 18 to 25 inches.

Syria.

- In SYRIA AND PALESTINE a moister and on the whole cooler climate prevails. Alike in the East and in the West, in Syria and Palestine no less than in Turkish Arabia, there are times when a fierce and scorching wind prevails for days together—a wind whose breath withers the herbage and is unspeakably depressing to man. Called in the East the Sherghis, and in the West Khamsin, this fiery sirocco comes laden with fine particles of heated sand, which at once raises the temparature and renders the air unwholesome to breathe. In Syria these winds occur commonly in the spring, from February to April; but in Turkish Arabia the time for them is the height of summer.

DISEASES.

- (5).(8.)(20.)(24.) *Fever.* Intermittent Fever is common in various parts of the country especially in the Sea-port towns and inland valleys.

*Plague.
Cholera.*

- (9.) Turkish Arabia is visited by the Plague occasionally and by cholera frequently. It is said that in 1773 two millions of people died of the Plague. In 1822 Cholera dispersed an army which was successfully advancing from Kermanshah in Persia against Baghdad. In 1846 it appeared in Baghdad and, out of a population of 80,000, attacked 20,000, and killed 6,000. Cholera has not had so many victims at its later visits, but it comes more frequently. September or October is the usual season for its breaking out in Baghdad.

*CURRENCY.**CURRENCY.*

- (2.) 40 Paras=1 Piastre.
100 Piastres=1 Lira.
1 Lira=about 18 Shillings.

Anatolia. Camels are not numerous in the Northern parts of Asia Minor, where the dense forests and the generally clayey soil cause the mud to remain longer on the ground, making travel dangerous to these animals. The best breed for the country is a cross between the Bactrian Camel and the Arab Camel. The former has two humps and the latter one. The cross has only one hump. Bactrian Camels are kept in small numbers in Southern Asia Minor for breeding purposes. The Arab Camels come from Mesopotamia and cost £ 7 or £ 8 each ; but they are not accustomed to the cold of the climate, nor can they travel in mud or climb mountains.

Strong thick-set horses cost from £ 3 to £ 7; (6.)

A pair of oxen	£ 6.
A cow	£ 2-10.
A pair of buffaloes	£ 8 to £ 13.
A sheep	— 8-6d.
And a goat	— 7—

Koordistan. On the frontier between Koordistan (24.) and Persia buffaloes are much used. They plough, they drag carts, they carry loads, they give milk, they are killed and eaten ; and where water is not scarce they are most valuable.

In the district of Van the flocks of sheep are numberless and provide the large markets of Asia Minor, Syria, and Constantinople. (4.)

Turkish Arabia. Of the domestic animals of Turkish Arabia, the camels, horses, and buffaloes are of superior quality, but the cows and oxen seem to be of a very inferior breed. The goats and the sheep are small and yield a scanty supply of a somewhat coarse wool. The horses are numerous and of the best Arab blood. The mules from the district between the Tigris and the Persian frontier, and the asses of Baghdad are (25.) famous. About 1200 mules were bought at Baghdad for the Abyssinian expedition of 1867-68 at an average price of Rs. 124-8- each.

APTITUDE OF THE TURKS FOR DEFENSIVE WARFARE.

APTITUDE FOR DEFENCE.

As Turkey is now again defending her provinces from the attacks of her old enemy, Russia, it may not be out of place to conclude this paper with an extract

from a translation of Von Moltke's work on the Russian Campaigns of 1828-29, shewing his opinion of their aptitude for defensive warfare.

(26.) " An outer wall with bastions, but without outworks ; " a dry ditch with a faced scarp and counter-scarp, but " narrow and shallow ; lines that are enfiladed, and in " many instances commanded by heights close upon " them ; a total absence of casemates ; an enceinte " filled up with houses built of lath and plaster, but " plentifully supplied with arms, ammunition, and " artillery—such are the usual characteristics of a " Turkish Fort. But then the Turkish Commanders " have the great merit of being blind to the weak " points of their places. Capitulations were not " relished by the Divan, and those who made them " risked their heads. The garrisons too were defending " their own wives, children, and worldly goods " within their walls and fighting for their faith. " They make up for the want of out-works by a skilful " use of the dry ditch, and their most vigorous defence " commonly begins at the point where with European " troops it usually ends, from the moment when a " practicable breach has been effected. With us a " large number of wealthy house-holders are a serious " impediment to the protracted defence of a fortress, " but in Turkey it is quite the reverse ; every man " capable of bearing arms is a soldier, and makes his " appearance upon the walls daily. Thus it is from " the large towns, and from them only, that a very " determined resistance is to be expected."

A. DUNLOP ANDERSON,

Captain.

23rd Punjab Pioneers.

AMRITSAR,
22nd May 1877.

*N. B.—The numbers in the margin of this paper refer to the list
of works consulted and given over-leaf. A. D. A.*

LIST OF WORKS REFERRED TO.

- (1.) Encyclopædia Britannica.
- (2.) Murray's Hand-book for Turkey in Asia.
- (3.) Black's Royal Atlas (1874.)
- (4.) Wild Life among the Koords, by Major F. Millingen (1870.)
- (5.) Travels in Asia Minor, by Van Lennep (1870.)
- (6.) Modern Turkey, by J. Lewis Farley (1872.)
- (7.) The five great Monarchies of the Ancient Eastern World, by Geo. Rawlinson M. A. (1871.)
- (8.) Narrative of a Residence in Koordistan, by C. J. Rich (1836.)
- (9.) Sanitary Report on Turkish Arabia, by Surgeon Colvill (1871.)
- (10.) The Euphrates Valley Route, by W. P. Andrew (1873.)
- (11.) Ancient Classics for English Readers-Xenophon, by Sir Alex. Grant (1871.)
- (12.) History of the Ottoman Turks, by E. S. Creasy (1858.)
- (13.) Narrative of the Siege of Kars, by Dr. Sandwith (1856.)
- (14.) From Bombay to Marseilles via Arabia and Syria, by Capt. A. D. Anderson, 23rd Punjab Pioneers (1871.)
- (15.) A campaign with the Turks in Asia, by C. Duncan (1855.)
- (16.) Narrative of the Euphrates Valley expedition of 1835-36-37, by General Chesney (1868).
- (17.) Kars and Erzeroum, by General Monteith.
- (18.) The Russo-Turkish Campaigns of 1828-29, by Colonel Chesney.
- (19.) A Tour in North East Anatolia, by W. Gifford Palgrave (1872.)
- (20.) Armenia and Erzeroum, by the Hon. R. Curzon (1854.)
- (21.) Sketch of the Russo-Turkish Campaigns of 1828-29, by Lieutenant General Sir R. Wilbraham (1876.)
- (22.) The Turkish Forces, by Lieutenant Colonel C. E. Howard Vincent (1876.)
- (23.) Islam, from Constantinople to Calcutta, by Major General Sir F. Goldsmid, C. B., K. C. S. I., (1877.)
- (24.) Travels in Koordistan, by J. Baillie Fraser (1840.)
- (25.) Official Record of the Expedition to Abyssinia.
- (26.) The Russians in Bulgaria and Rumelia, by Von Moltke.

A. D. A.

III

STRATEGIC CAVALRY MANŒUVRES.

Studies and proposals suggested by the great strategical manœuvres of the Russian Cavalry on the Vistula in the Autumn of 1876 by George Cardinal von Widdern, Captain à la suite, Kings Grenadier Regiment &c. &c., published by A. Reisewitz, Gera, 1877.

TRANSLATED FROM NO. 26, MILITAIR-WOCHENBLATT OF THE 30th MARCH 1877.

The Author, already well known by his military writings, offers us here a new and interesting work : it is in two parts ; the first gives a description of the great Russian strategic Cavalry exercises which took place in the foregoing autumn between the Prussian frontier and the Vistula, and in the second the author adds proposals for the execution of similar manœuvres by our (German) Cavalry.

We will endeavour in this review to give the reader an idea of the design and course of these manœuvres, as carried out by the Russian Cavalry.

The theatre of operations was East of the Upper Warta, including the space between that river and the Vistula, and over the latter above Warsaw as far as the railway which connects Warsaw with the fortress Brzesc, Litewsk.

The object of the manœuvres was to practise the Cavalry in those strategical operations which would specially fall to its lot in time of war viz : obstructing and preventing the mobilisation of parts of the enemy's army, occupation of lines of railway, and points which would be important to the enemy, either with a view to destroy them or to turn them to its own advantage, covering the road and railways used for mobilisation against enterprises by the enemy's Cavalry, reconnaissance of large tracts of country as well as of particular positions, and obtaining information of the enemy's movements.

The Western Corps (Invading Cavalry) numbered 33 squadrons with 24 guns, the Eastern Corps 40 Squadrons with 30 guns ; to the first belonged the 5th and 14th divisions with a proportion of Cossacks, to the latter the 6th and 13th divisions with the Guard-brigade.* Besides the Cavalry all troops quartered within the field of operations took part in the manœuvres ; in all 3 rifle battalions, 5 infantry regiments and 6 field batteries. The advance towards the different points

* The Russian Cavalry, even in peace time is formed in independent divisions, each of 2 brigades, each brigade of 2 regiments, with 2 Horse Artillery batteries attached.

where the manœuvres were to begin was conducted as if in real war : all water and railways reconnoitred, strategic information collected, and maps improved. During the march, within a zone of 10-15 kilometres (6-9 miles) broad, great stress was laid on keeping up lateral communication between the columns of route, and care taken that the heads of the several columns were kept on a general level. Positions assumed to be held by the enemy were reconnoitred, bivouacs and encamping grounds covered, and out posts sent forward under the supposition that there was no time to place them in a formal and regular manner. The garrisons within reach of the advancing troops were supposed to be caught in the act of mobilising, and it was the part of these garrisons to put all possible obstructions and impediments in the way of the advancing cavalry, at the same time guarding themselves against surprise &c.

The general idea was briefly this : An army of the West operating from Posen on Warsaw, had on war being declared, pushed forward its cavalry on the two main roads leading from the Grand Duchy of Posen to Warsaw, one division on the Konin road, the other more South by Kalisch and Petrikau. Both lines of operation meet at the important railway junction Warsaw, Thorn and Warsaw. At the beginning of the advance the Southern division of the invading cavalry was to send a flying column across the Vistula against the railway joining the fortress Brzesc, Litewsk with Warsaw. When the invading cavalry first appeared the Warsaw troops had not completed their mobilisation : the cavalry (of the East Corps) had still one division and the Guard-brigade in and round Warsaw, and one division was on its march from Lublin to Radom. Their plan was to encounter the enemy with all disposable forces, to gain all intelligence of the advance, to cover the important railway junction of Skierne and to protect the railway communication to Warsaw in their rear. Very stringent orders were given by the Commander of the Eastern Corps to those garrisons which were supposed to be mobilising in the zone of operations of the invading cavalry, also the co-operation of the civil authorities was strongly insisted on for the purpose of gaining intelligence of the enemy, and specially of his flying columns.

Into the details of the operations we will not enter but refer our readers to the work under consideration in which the author describes the events in a masterly manner. We will only say that the invading cavalry succeeded without any great difficulty in surprising the different infantry garrisons, and considerably impeded the mobilisation ; it must be confessed however that this easily attained result was due more to the want of circumspection on the part of the adversary than to the conduct and leadership of the cavalry. The first shock between large masses occurred near the railway junction of Skierne where the invading cavalry gained a decisive victory, chiefly because the leader of the hostile troops was ill informed as to the movements of his adversary, because with his defensive he did not combine the offensive (by

which latter alone cavalry can obtain results), and because he failed to follow up partial successes.

It is interesting to follow the movements of a flying column of four squadrons, which was detached from the division of invading cavalry advancing by Petrikian, and sent across the Vistula to break up the railway between Warsaw and Brzesc-Litewsk. To estimate rightly the task of this column it must be observed that the distance from the starting point Petrikian to the point aimed at on the above mentioned railway is about 300 Kilometres (188 miles), that besides a large river there were several streams to be crossed, and in addition to the opposing troops it was necessary to outwit the civilian officials who were on the look out to inform the Commander of the East Corps of every movement. It was an operation calling to mind those raids made by the boldest leaders in the American war of secession. The column, carrying provisions on pack horses, left Petrikian at 10 o'clock in the morning of the 15th September, crossed the Pilica twice, and reached the Vistula at 6 in the morning of the 17th September, having throughly deceived the enemy as to its line of march. The first day it marched 40 kilometres (25 miles), the second day, with the exception of a two hours rest it was on the march all day and all night, and did not halt till 6 in the morning of the third day; thus in 46 hours 160 Kilometres (100 miles) were covered—by one squadron of hussars 180 Kilometres and by single patrols as much as 200 Kilometres. Moreover the march, was partly over deep ground and across fields, and on the 2nd day the weather was very bad. The result of this great rapidity was that all measures taken by the enemy, and based upon information received as to the movements of the column, were always too late. It is noteworthy that after this tremendous ride only one horse was done up, all the others quite fit for service. The riders however were more exhausted, not having tasted a hot meal during the whole march.

All day on the 17th September the column was passing the river on a flat bottomed boat, without being seriously interfered with by the enemy. It is incomprehensible that although such attempts on the part of the column were expected, all boats should not have been withdrawn and made fast on the other side of the river, a measure which would have effectually prevented the passage.

After the column had reached the other bank in safety it remained there inactive till the morning of the 19th September (*i. e.* two whole days after commencing the passage of the river) at a distance of only 10 Kilometres from the railway to be destroyed. Then at last, the leader of the column proceeded to finish his task, which he succeeded in doing, thanks to the inactivity of his adversary, and in spite of his own waste of time.

We cannot think that the halt after the passage of the Vistula could have been premeditated, for if the enemy had acted with any energy it would have caused the collapse of the whole undertaking and have greatly endangered the safety of the column. The repose taken

in this critical situation is only to be accounted for, in spite of the statements of the "Russian Invalid," by the assumption that the column was too much exhausted at once to continue the operation.

After the destruction of the railway the task of the column was supposed to be completed, and it was sent by rail to join its division and take part in exercises against a marked enemy; but in our opinion only part of the problem had been solved; the withdrawal of the column from the midst of the enemy was not attempted; and yet we have seen that often in those American raids after the object had been attained with comparative ease and little loss, the real difficulty was to withdraw, when an active adversary had been hurrying up on flanks and rear.

The passage by a flying column in the face of an enemy of a water-barrier like the Vistula at Warsaw is an enterprise which would certainly not succeed if the enemy were on the alert and took proper precautions.

As before remarked the author appends proposals for similar manœuvres to be carried out by us (*i.e.*, in Germany.)

No one will deny the importance of such manœuvres for developing the warlike attributes of cavalry, and we can only second the wish of the author, that we may undertake something of the same kind. The difficulties attending such exercises are not insurmountable; the feeding of men and horses must be managed with preserved meat and compressed forage carried on the march.

The author closes his work with a general and special idea of how a manœuvre by two cavalry corps with a proportion of infantry attached, might be carried out between the Oder and the Elbe.

We end our review with a wish that this valuable publication may meet with the consideration it deserves, and that the proposals of the author may have a fair trial.

Translated by

R. ELIAS, CAPT.,
59th Regiment.

IV.

“LIMBERS AND WAGONS.”

In the Proceedings of the Royal Artillery Institution Woolwich for October 1876, there was a brief comparison drawn by an Officer of the Royal Carriage Department, between three service Limbers with two horses each, and one ammunition wagon with six horses.

The general results of the examination of this question were adverse to the three Limbers.

In 1875, however, a proposal had been put forward by Major Ellis to substitute two limbers for each wagon—these two Limbers carrying between them the same amount of ammunition as the present service wagon.

Practical effect was given to this proposal early in 1876, so far that a service limber was temporarily converted on this plan, and put through a series of experiments. With the assistance of the various data given in the above two cases the following facts may be considered to be established.

“The weight upon the shaft horse, in the wagon 60 lbs., becomes “in the Limber without a hind carriage 96 lbs., which weight each of “three out of six horses, instead of but one, would be oppressed by.” This with 3 Limbers. But in Major Ellis’s altered Limber the weight on the shaft horse, even when that Limber was not limbered up, but by itself without a hind carriage, was found to be only 64 lbs. The difference between this and the 60 lbs. above quoted is so small that it may be put down as probably due to variation in the testing of the weight on the shafts, which requires great nicety of adjustment.

Now with regard to the load, and the motive Power. The Service wagon packed weighs 40 cwt. 0. qrs. 2 lbs., while Major Ellis’s limber also packed weighs 18 cwt. at most, or 2 cwt. 0 qrs. 24 lbs. more than the service limber, but 22 cwt. 0 qrs. 2 lbs less than the ammunition wagon. Two of Major Ellis’s limbers would thus weigh 36 cwt. only or 4 cwt. 0 qrs. 2 lbs. less than the Service Wagon, while carrying an equal number of rounds of ammunition—“which—the number of rounds of ammunition carried being the same in both cases—gives 4 cwt. 0 qrs. 2 lbs. of additional and perfectly useless load.”—But, in this comparison of the *two* limbers, the extra weight is *with the wagon*—whereas in the case of the three service limbers, the disadvantage rested with those limbers. The wagon with 6 horses gives a load per horse of 747 lbs. one of the proposed Limbers could have four horses, while the other had only two horses, making together the six horses allowed for the wagon. With four horses in Major Ellis’s limber the load per horse would be 504 lbs. while with only two horses it would be 1008 lbs.

This latter load, however, would be none too great for the 2nd line of limbers which need only move at a walk. The first line of limbers with 4 horses each could always keep up with the guns, even on Service.

The number of carriages of a Battery turned out on Major Ellis's plan with the same number of Guns and carrying the same total number of rounds (888) as now, would be increased by four only, counting each separate limber as a carriage.

But such Battery on a peace footing, would require 12 less horses, than are at present allotted to a Battery in India. There would be one more Spare wheel with each Battery. The Equipment itself would require exactly the same number of wheels to travel as at the present moment; and yet the extent or depth of the Battery in column of route would be diminished by 2 yards. It follows from the foregoing, that, over and above any of the special advantages claimed by Major Ellis for his plan, there would be a possibility of placing in the Field, without any extra expense, in horses, Drivers, or harness,—9 Batteries for every 8 Batteries on the present system,—or, we may say, 540 Guns instead of 480, on a peace footing.

The special advantages claimed for this system are as follows; greatly increased mobility. Eighteen more rounds with every gun limber than at present. Thorough interchangeability, and uniformity, of every part of the Equipment. A more rapid, and easy supply of ammunition in the Field. Much less weight on the shaft horse, under the same conditions. The alterations could be carried out quickly, and at small cost, and the eventual economy would be very great. Again, the advantages possessed by a system of comparatively light Limbers over a system of heavy ammunition wagons, when marching over difficult country, and more especially in going down steep hills, and in making sharp turns, are too obvious to require further comment.

W. B. E. ELLIS,
Major R.A.

V.

BURMAH FROM A MILITARY POINT OF VIEW.

Burmah, owing to its isolated situation, the characteristics of its inhabitants, and its external relations, may in a military point of view be regarded as a country apart, one entirely and thoroughly distinct from the other portions of British India. It is cut off by the mountains or the sea from the rest of the empire. Its only communications therewith are by water. It stands by itself an outlying province, and should therefore in the hour of danger be able to rely on its own resources to repel invasion or maintain tranquillity. Its people differ in race, in language, in habits and in disposition from those of India. They have no affinity to Hindoos or Mussulmen, no sympathies with the wants of the Indian people, nor with the political aspirations of Indian princes. Its external politics have little or nothing to do with the great peninsula across the Bay of Bengal. Its only foreign relations are with China and Upper Burmah, the Shan States and Siam. It knows little and cares less about the politics of Cabul and Teheran or of Cashmere and Yarkund. Its orbit is in another sphere. It has its own part to play in the world's history. What lower Bengal was to Hindostan a hundred years ago, that is lower Burmah to-day to the rest of the Indo-Chinese Peninsula. Such are the bases on which we start—a separate national existance and a new and distinct sphere of action.

In considering the subject before us, it will we think be advisable to study the question in its different aspects. A subject which embraces so many considerations is always difficult to treat unless subdivided and as subdivision conduces to simplicity, we propose to discuss the subject from its several points of view.

1st. Is the present garrison sufficient to maintain order, or is it suitable for that purpose.

2nd. Is it capable of resisting invasion from Upper Burmah.

3rd. Is it capable of resisting a maritime attack.

4th. Is it capable of invading Upper Burmah, and if not what force do we require.

5th. Is it adapted to repress frontier raids or to execute small frontier expeditions against hill tribes &c.

Having discussed the subject under these various aspects, we propose to consider.

1st. The changes we deem advisable both in the composition and the distribution of the forces in Burmah.

2nd. The changes and augmentations attendant on the invasion and annexation of Upper Burmah.

"Is the present garrison sufficient to maintain" "order, and is it suitable for that purpose."

The garrison at present consists of :—

2 Regiments British Infantry	}	in all perhaps
4 " Native "		4500 men
1 Company Madras Sappers		the official strength
5 Batteries of Artillery		is 5519 men.

The above force is distributed as follows :—

Rangoon	{	1 Regiment	British	Infantry
		1 "	Native	"
		1 Company	Madras	Sappers
		2 Batteries	Garrison	Artillery
Thyetmyo	{	1 Wing	British	Infantry
		1 Regiment	Native	"
		1 Field	Battery	"
		1 Wing	British	Infantry
Tonghoo :—	{	1½ Battalions	Native	"
		1 Mountain	Battery	of 4 guns
		1 Garrison	Battery	"
Moulmein :—		1 Wing	Native	Infantry
Shwegheen :—	100 Madras Sepoys	detailed from Tonghoo.		

Now is the above force sufficient ? We maintain that it is. The Burmans as a rule are well affected to our Government, and that they are contented is evident from the fact that they do not emigrate from our territories, whilst at the same time there is an increasing immigration from Upper Burmah. Moreover were even the wish to exist, any considerable rising would be utterly impossible. The people have neither the means nor the organization, they have no facilities for obtaining the sinews of war, they have no old soldiers to lead or direct them, they have no great rajahs round whom they might rally, they have not even the memory of great wrongs to nerve them for a struggle, they have nothing to bind them together, there is an utter want of that unity and cohesion so indispensable to the success of a popular revolt. Convinced therefore as we are of the general contentment of the people and of the impossibility of any organized rebellion we unhesitatingly and confidently assert that the present garrison is sufficient, perhaps more than sufficient to secure internal order, but, is it distributed in the best possible manner, and is the force adapted to the country ? These questions we reserve for discussion later on.

"Is it capable of resisting invasion from" "Upper Burmah."

An invasion from Upper Burmah seems an event so improbable that at first sight we are almost prompted to leave it out of discussion, but there is nothing so ridiculous or so insane that a vain-

glorious and half savage potentate may not in his pride and ignorance attempt it. An invasion may then be considered as one of the possibilities of the future. On what scale would such an invasion be, what have we to meet it, and how should we repel it ?

Of course there is but little to guide us as to the scale on which the invasion would be, but we have heard it stated by one of the best informed of the Burmah Commission, and one who had long resided in Mandalay, that the king could probably throw eighty or a hundred thousand men on our frontiers with very little notice or preparation ; if this be true, it follows that we might have to depend on local resources alone to bear the first brunt of an attack. Would those local resources be equal to the occasion ? We again confidently affirm that they would. A large army, such as the Burmese, without organized means of supply must subsist on the country which it invades. Its operations must therefore be confined to those districts in which the means of subsistence are to be found, and from this it is evident that a Burmese invasion must of necessity restrict itself to the valleys of the Irrawaddy or Sittang, any deviation from those lines would result in starvation or at all events in the complete dispersion of the invading army for purposes of subsistence. Now the valleys of the Irrawaddy and Sittang are barred by the frontier stations of Thyetmyo and Tonghoo, and we believe that the forces there located are amply able to prevent further progress. A thousand well disciplined, well commanded British troops ought to be able to hold at bay any number of such a rabble as the army of the Golden Foot, and if that army were unable to force its way, it must of necessity from want of food and munitions of war, give way, retreat and finally dissolve.

Such in our opinion would be the fate of any invasion, but that we should be subjected to much annoyance, that the frontier districts would be infested with dacoits and that the country generally would be much excited admits of little doubt. That however is not the question ; The invasion would be unsuccessful, the conquest of British Burmah would not have been accomplished, and therefore we say that the present garrison is capable of resisting invasion from Upper Burmah. The means of suppressing disturbances in the districts infected by the invasion we reserve for future consideration.

“ Is it capable of resisting a Maritime Attack.”

By a maritime attack we do not mean an invasion for the purpose of conquest, but the predatory incursions of an enemy's cruisers, incursions made to paralyze the trade of the country and to spread terror along its seabord.

It may be contended that England being mistress of the seas we should have no cause to fear attacks of such a nature, but it is quite conceivable that some day a combination against us may arise which

would compel the withdrawal of the greater part of the Indian squadron to European or American waters, and at such a moment what is to prevent the appearance on the ocean of another Alabama ?

A maritime attack is then a contingency against which we must provide unless we wish to see our coasts ravaged, our shipping sunk, and our ports destroyed.

Burmah presents a long line of coast open to the attacks of an enemy. Akyab, Bassein, Rangoon, Moulmein, Mergin and other minor ports are all accessible points which invite attack. How are we to defend them and the ships that they shelter ? It is an axiom of strategy that the best way of defending an extensive frontier is by guarding its most vulnerable points. What are the vulnerable points of the Burmese coast line, in fact what are the points at which an attack would most surely paralyze trade and cause the greatest amount of damage ? and how are those points to be defended ?

Rangoon and Moulmein as the two most thriving places in Burmah and as its principal ports, undoubtedly are those points, the rest must be left to providence and the tender mercies of the enemy. At the present moment both towns are defenceless against a marine attack, and any enterprising enemy might sail up to either, sink the shipping and destroy all within range of his guns. The troops in Rangoon would be powerless to prevent such an attack, while those in Moulmein could hardly guarantee that a landing should not take place. We may therefore conclude that British Burmah in its present condition is not capable of resisting a maritime attack.

"Is it capable of invading Upper Burmah" "and if not what force do we require."

Before we can decide this, we must settle what would be our plan of campaign, what resistance we should meet with and what force could overcome that resistance. As regards the first question, there can be little doubt that the most effectual means of rapidly and decisively concluding a war with Burmah would be to direct a sudden and heavy blow at the capital, and then having taken it, to overrun the country with small but compact flying columns. It is probable that our troops would meet with no very determined resistance excepting at Mandalay itself, and once that was overcome the rest would be comparatively easy. The force requisite to effect this first object of the campaign need not exceed four or five thousand men, such a force would probably be more than enough to defeat the King's army and seize his capital. That accomplished, further reinforcements would be required, as it would be necessary to send out columns towards Bhamo and Theebo as well as one up the Kyendwen valley, and a garrison of at least 2000 men would have to be left in Mandalay, besides smaller ones at various points on the Irrawaddy between Mandalay and the British frontier.

Meanwhile another small column might advance from Tonghoo and marching via Yeméthen clear the country to the south and east of the capital.

Briefly then, the invading army might be organized in two columns, one to start by river from Thyetmyo, the other to march by land from Tonghoo. The composition of the first might be :—

Approximate strength 4000 men	2	Battalions	British Infantry
	4	"	Sepoys "
	1	Battery	Field Artillery
	1	"	Mountain Train
	1	"	Garrison Artillery
	1	Company	Sappers.

The second column might be composed of :—

Approximate strength 2000 men	1	Battalion	Europeans
	2	"	Sepoys
	1	Battery	Mountain train
	1	Company	Sappers

After the capture of Mandalay by the first column, a garrison of one battalion of Europeans and two Sepoy regiments, with the field and garrison batteries might be left in the city, and the remainder sent up the river to Bhamo, from which point the Chinese frontier and the attitude of the hill tribes might be observed. The flying columns for the Kyendweu valley and the eastern frontier might each consist of :—

About 1500 men	1	Wing European Infantry	
	2	Regiments Native "	
	½	A rocket Battery	
	½	A company of Sappers.	

The Native Infantry attached to each column would be sufficient to keep open the communications, while the Europeans would furnish the fighting element at the head of the column. Besides the above we should probably require a couple of battalions for garrison duty at Membo, Pagan &c. Altogether we estimate the force required for the invasion of Upper Burmah, irrespective of any column that might be despatched from Assam to clear the northern part of the country at :—

4	Battalions	British	Infantry	{
12	"	Native	"	
1	Battery	Field	Artillery	
1	"	Garrison	"	
2	Mountain	Batteries	"	
1	Rocket	Battery	"	
3	Companies	Sappers and Miners.		

A small force compared with the 30,000 men employed in the first Burmah war, but one we believe amply sufficient to achieve success. The progress of science it must be remembered, has immensely increased our relative superiority, while the Burmans no longer view us with that antipathy and contempt, engendered by ignorance which was so conspicuous and rendered them so much more formidable during that war. But small as the force is, British Burmah could not of course supply it, we may therefore surely conclude that it is *not* capable of invading Upper Burmah. That however is immaterial as we should not dream of doing so, unless we could with safety indent on India for the troops required.

"Is it adapted to repress frontier raids or to execute small frontier expeditions against hill tribes &c.

Regarded from this point of view the force in Burmah is ill adapted to the country. It has not the mobility requisite to suppress with promptitude such attacks as frontier raids, nor could it execute small expeditions without much delay and great preparation. In support of this statement we have only to cite what occurred in February 1876. The Karenne Boundary expedition being threatened with armed opposition, it was decided to send to its support from Tonghoo, a small flying column of 2 mountain guns, 100 Europeans and 200 Sepoys; luckily it was not required. We say luckily because small as this force was, it would have been positively unable to move for at least a month. Biscuits and other stores had to be obtained from Rangoon, and time was necessary to collect together a sufficient amount of transport animals. Even supposing all things at hand as they should be, and the force ready to move, encumbered as it would have been with baggage and animals, hospital tents and doolies, its progress through the hills and jungles of the Karen country, would have been slow indeed, and it would have arrived at the scene of action probably only to late.

It must be remembered that the Burmans, Shans and Karens with whom we may have to deal, move from place to place with the utmost celerity, they have no baggage to encumber them, and each man carries all he requires for the march, a gun, a 'dah,' a wallet containing rice &c, and a blanket or mat. Lightly equipped as he is, he has only to get over the ground, and need not bother his head about his communications, if he is wounded or sick he takes shelter in the nearest village. Therefore to catch him you must employ men as lightly equipped as himself and able to dispense with such luxuries as usually accompany British troops in the field, men accustomed to jungle life and acquainted with every village and path, men who know the language and understand the people, in fact you must employ men of the same race as those with whom you have to deal, otherwise you will certainly fail, or succeed only with an incalculable expenditure of time and money. What we require then to render the army in Burmah

capable of executing small frontier expeditions at the shortest notice is one or more battalions of Burmese soldiers.

They should be officered by Europeans only, and should be composed of men of every race, from all parts of the frontier, from the Arracan Hills, from Upper Burmah, from the Shan states, and from Karennee, and they should be well armed and lightly equipped so as to be on equal terms with their opponents. It will be urged against such an innovation, firstly : that the experiment has been tried and that it was found impossible to discipline such men, secondly : that they could not be trusted on service. To meet these objections we have only to say that if British officers are not capable of instilling sufficient discipline they must have sadly deteriorated of late years, and further that the strict discipline and steadiness on parade of a Sepoy regiment would not be necessary, for assuredly a very little training would make them infinitely superior to any enemy they might meet in the Indo-Chinese Peninsula. They would be more than a match for any hill tribe we know of, and they would be simply invaluable in the event of our invading Upper Burmah, as they would be to the army of invasion what the Corps of Guides is in India to an expeditionary force on the North-West Frontier. With regard to the second objection we have only to point out that during the last Burmese War, the old local battalions did excellent service, and never once betrayed the trust reposed in them.

A Burmese battalion will we concede never attain to the precision of movement displayed by Europeans or Natives of India, nor will it ever be in any respect a showy body of men, but we maintain that for repressing frontier raids and executing small frontier expeditions, it will be far more valuable than either native or European Infantry, the latter are too expensive, and to employ them in such work would be like using a Woolwich Infant to batter down a bamboo stockade, while the former would be little better than Burman troops and would be far more difficult to move. Such are our reasons for asserting that the force in Burmah is *not* adapted to repress frontier raids nor to execute small frontier expeditions against hill tribes.

The changes deemed advisable in the composition and distribution of the force.

In the preceding pages we have endeavoured to point out our deficiencies, it is now our purpose to indicate the remedies for those deficiencies. We have shown that the present force is sufficient to control the country, and to resist an invasion from Upper Burmah. We have exposed its inability to resist maritime attacks, and its unsuitability for border or mountain warfare. And we have demonstrated, what needed no demonstration, the impossibility of invading Upper Burmah without further aid from India. Let us now consider how the

weak points in our armour are to be strengthened. With regard to maritime attacks we have said that it is hopeless to attempt to defend every point on the long coast line of Burmah, and that all our efforts should be concentrated in the defence of Rangoon and Moulmein. The former, from the nature of the approaches to it, offers peculiar facilities for defence. A heavily mounted fort or battery at a place about thirteen miles up the Rangoon river, and where it makes a sharp bend to the East, would certainly impede if not altogether prevent the passage of an enemy's ships, while a well arranged system of torpedoes in combination therewith would effectually bar further progress. The battery might for the greater part of the year be left in charge of a warrant officer, with a few gun lascars, the Artillery at Rangoon being sent down annually for a course of big gun drill and target practice. The Artillery at Rangoon should in such a case consist of at least two batteries, one for the manning of the fort in question, the other for the defence of the Shaay Dagon Pagoda and arsenal, which is now fairly fortified and from its position very defensible. The Company of Madras Sappers in Rangoon should be thoroughly trained in the use and management of Torpedoes, the submarine defence of the river being intrusted to their care. In time of war if required, small parties might be detached to Moulmein and the Bassein river, to make similar arrangements in those localites for defence by torpedoes.

With the topographical features of Moulmein we are unacquainted, but if no suitable position exists for the erection of a fort to protect the town and shipping, or if it should be considered undesirable to detail yet another garrison battery to Burmah, it might at least be advisable to provide Moulmein with a floating battery of the type represented in Bombay harbour, the said ship being manned by Chittagong men, and the guns worked by Europeans under naval instructors. The European and Eurasian community of Moulmein ought surely be able to muster a volunteer corps sufficient for this purpose, and the expense of maintaining the small necessary permanent establishment could not be very great.

A couple of gunboats for the Irrawaddy might complete the marine defences of Burmah, and considering the interests at stake is it too much to ask?—A fort, a floating battery, a couple of gunboats and a few torpedoes. If these will secure us as we think they would, from the attacks of an enemy's cruisers, we say that, the security will be cheaply acquired,

Let us now pass on from the subject of coast defence to that of border and mountain warfare. We have already shown pretty conclusively how ill adapted is our Army in Burmah to carry on operations which require great rapidity of movement and a thorough acquaintance with the country, and we have already propounded what we believe to be the only feasible solution of the difficulty, namely the creation of a local force. The military advantages to be derived therefrom and the difficulties attending its creation we have already touched upon, we

now wish to urge the social and economic advantages of the scheme. In the first place it would be a cheap and valuable force compared with a similar force of Madras native Infantry. The expense of transport, invaliding, large hospital establishments &c, would all be saved, while the number of effectives would be greater proportionately in the Burmese portion of the army than in any other. In the second place the money given by way of pay and allowances, would remain in the country instead of being sent to and expended in India. Is it not manifestly unfair to Burmah, that there should be so large and constant a drain on its resources as family remittances imply ? and is it not unjust to the people that they alone should be debarred from military service ? In fact it comes to this :—The revenues of Burmah are applied, not for the benefit of the Burmese themselves, but for the good, direct, and indirect, of the natives of India, and it is India not Burmah which is the great gainer by British supremacy in these provinces. Can this be right ? Now the additional cost involved by the raising and maintenance of a Burmese force, would not be money lost to Burmah, as nearly all of it would be expended in the province itself, and therefore the province would really be no poorer than it was before, although the item of military charges might be greater, that is supposing no reduction was made in the number of Madras troops. The imperial exchequer though would of course be a loser by whatever the local forces cost, unless a corresponding reduction was made in the number or strength of the Madras regiments. Economically therefore we think such a scheme would benefit Burmah. Socially too we believe it would bear good fruits. The existance of such a force would tend to diminish crime, as it would offer an outlet for those lawless spirits, who now for want of a congenial occupation, turn their attention to Dacoitee and similar pursuits, moreover the force would attract men from across the border, and they in their turn would induce others to come and settle in our territory so that indirectly the stream of emmigration to the British provinces would be steadily increased by the adoption of such a scheme. So much for the social and economic aspects of the case, while regarded in a military sense, there can we think be no two questions on the subject. Burmese troops, with the aid of a few gunners, would be those best suited to mountain and jungle warfare. In case of an invasion from Burmah proper they would be invaluable for clearing the country of such bands of dacoits as would inevitably arise at such a time. While in the event of an expedition beyond our frontiers what an inestimable boon such a Corps would be to a commander ignorant of the country through which his path lay.

As to the difficulties in our way, we are firmly convinced that British Officers with tact and energy will easily overcome them. We must only take care to consider the habits and prejudices of the people, place no obstacles in the way of discharge or re-engagement, be liberal as to furloughs and not too harassing or too exacting in trivial matters, be firm in insisting on implicit obedience, instruct the men thoroughly in all that is essentially necessary, and before long we shall find that

we possess a force fairly efficient and of no little importance from a military point of view. We have now discussed the only radical changes we have to propose, namely the organization of coast defence, the formation of volunteer corps at the two principal ports, and the creation of a local Burmese force. The distribution of the army in Burmah remains to be considered.

Proposed Distribution of the Army in Burmah.

Section.	Battalions British Infantry.	Battalions Madras Infantry.	Battalions Burmese Infantry.	Field Batteries.	Mountain Batteries.	Garrison Batteries.	Companies Madras Sappers.	Volunteer Corps.
Rangoon	1	2	—	1	—	2	1	1
Thyetmyo.	$\frac{1}{2}$	1	1	—	1	—	—	—
Tonghoo.	$\frac{1}{2}$	1	1	—	1	—	—	—
Shouaygheen.	—	100 men detached from Regiment at Tonghoo.	—	—	—	—	—	—
Moulmein.	—	$\frac{1}{2}$	—	—	—	—	—	1
Total.	2	$4\frac{1}{2}$	2	1	2	2	1	2

If we compare this distribution of the army with that now authorized, we find that the Rangoon garrison has been increased at the expense of Tonghoo, and that the composition of the two frontier garrisons has met with considerable alteration. If we consider the "raison d'être" of Tonghoo, it at once becomes apparent that the force there stationed is unsuited to the locality, it is intended in the first place to secure and cover the valley of the Sitang, and in the second to serve as the point of departure either for a column operating against Burmah or for a small expeditionary force proceeding to the hill country to the East. The first object it fulfils most thoroughly, but though a suitable base for operations, it cannot be said to satisfactorily fulfil the second, in that as we have already shown, it is incapable of despatching an expeditionary force without either loss of time or extraneous aid, and it is to remedy this latter evil that we propose to there localize a battalion of Burmese Infantry. We also propose that the mountain battery be increased from four to six guns so that we may dispense with the Garrison battery without incurring either difficulty or risk by detaching 2 or even 4 guns for service with a moveable column. We should then at any time be able to send into the Hills or elsewhere, at least a battalion of Burmese and 3 or 4 mountain guns, still leaving behind, a couple of guns or so, $\frac{1}{2}$ a battalion of Europeans and 500 Sepoys, and

if such a force cannot hold its own in such a situation, the sooner we turn out of Burmah, bag and baggage, the better for all concerned. The extra half battalion of native Infantry and the Garrison battery now stationed at Tonghoo are worse than useless, as they are a burden, and fulfil no object. In no case would it be deemed advisable to maintain at Tonghoo such a force that it could of itself march on Mandalay, unless indeed war were imminent, and therefore the extra half battalion is only an incumbrance, while as for the Garrison battery its retention in its present position is incomprehensible, it cannot act offensively in the hills or jungles, nor would it be required to do so with the elephant battery at hand, it will never be wanted to oppose the heavy artillery of an enemy, nor to batter the walls of a fortress, and if things ever come to such a pass that we have to rely on guns and intrenchments, then we may indeed say—"God help us!"

From Tonghoo let us pass on down the river to Shouaygheen. There we have proposed no alteration, not because we deem a military force necessary at that point, although it does command a trade route to the East, but simply because we believe that the 500 Sepoys at Tonghoo are quite sufficient to perform the various guard duties allotted to them and that the extra hundred may just as well be at Shouaygheen as anywhere else. At Rangoon we have increased the force by a battalion of native Infantry and a battery of Field Artillery not to speak of the local volunteer corps, and by so doing we aver that we have greatly enhanced the efficiency of that force, and at the same time added to the offensive power of the province. For this augmentation would enable the General commanding to amuse himself with occasional Brigade drills in time of peace, and in time of war or civil commotion to despatch thence in any direction to Arracan or Tennesserim, to the valley of the Sitang or the Irrawaddy as occasion might require, a compact little force of 3 or 4 companies of Europeans, a battery of Artillery and a battalion of native Infantry, still retaining sufficient troops to ensure good order in Rangoon itself.

The force at Rangoon is from its position available for service anywhere, whereas the troops at the frontier stations are only available for service in their respective zones of operations, it follows therefore that every man not actually required elsewhere, should be stationed at Rangoon, and that it is there that all surplus troops should be concentrated. As regards Thyetmyo we have proposed to add a mountain battery similar to that at Tonghoo, to localize a battalion of Burmese Infantry, and to remove the Field battery to Rangoon. With reference to the first proposal it will we think be conceded, that in the event of our having to invade Upper Burmah, a mountain battery in the Irrawaddy valley will be most urgently required for the operations that would follow the capture of Mandalay, and as to the second no one can doubt that a Burmese battalion would from its knowledge of the country be of the greatest use with the advance Guard of the invading army, and if so, where could it be better posted than at Thyetmyo the

point of departure for the Irrawaddy column. The field battery is useless at Thyetmyo as from the nature of the country it cannot move out of the cantonments, it may therefore be just as well at Rangoon from which place it could be embarked for operations on the Irrawaddy as easily as from Thyetmyo.

We believe that the changes above indicated are all that are required to render satisfactory the distribution and composition of the army in Burmah from one and every point of view. The force is sufficient to keep the province in order, it is distributed so as best to repel aggression either from the North or from the sea, it is adapted to the exigencies of frontier service, and it is so located that it may easily be utilized for the purpose of attacking Upper Burmah.

"The changes and augmentations attendant on the Invasion and occupation of Upper Burmah."

We have already stated the force desirable for offensive operations, it remains to be seen how much of that force could be supplied by the British Burmah Division and also what reinforcements from India would be necessary. Looking at the distribution table it appears that the whole of the Sittang column could be formed out of the garrisons of Rangoon & Tonghoo, the former giving $\frac{1}{2}$ a battalion of Europeans, one Battalion Native Infantry and one company of Sappers, Tonghoo giving 3 companies Europeans, one battalion Burmese Infantry and 4 guns from the mountain train. The total would thus approximate to that recommended for the Sittang column and the whole could be concentrated on the frontier within three weeks, and there would then still remain at Tonghoo as a garrison, the Shouaygheen detachment having been brought up, one company of the European regiment, 2 guns mountain train, and one Battalion Native Infantry, a force sufficient for all purposes considering that the front would be covered by the Field column.

The Irrawaddy division would have to obtain nearly all its infantry from India as the Burmese battalion at Thyetmyo would be the only one remaining available for the field, but the whole of the requisite artillery could be collected in the province viz :—

- 1 Field Battery from Rangoon
- 1 Garrison " " "
- 1 Mountain " (4 guns) " Thyetmyo.

No time therefore would be lost in getting together and transporting from India, guns, horses, and all the other incumbrances of Artillery, and all we should have to indent for, to complete the Irrawaddy division would be.

- 2 Battalions British Infantry
- 3 " Native "
- 1 Company Sappers.

A force that could be readily collected and embarked either at Calcutta or Madras, and easily conveyed to Thyetmyo within three weeks. So that in that space of time, without any strain whatever, we ought to be able to commence the preliminary operations of the war, still leaving as garrisons, to secure our base,

At Rangoon ...	$\begin{cases} \frac{1}{2} \text{ Battalion British Infantry.} \\ 1 \text{ Native } " \\ 1 \text{ Battery Garrison Artillery.} \\ 1 \text{ Volunteer Corps.} \end{cases}$
At Thyetmyo ...	$\begin{cases} \frac{1}{2} \text{ Battalion British Infantry.} \\ 1 \text{ Native } " \\ 2 \text{ Guns mountain train.} \end{cases}$

Later on after the fall of Mandalay, further reinforcements would be required, amounting perhaps to one Battalion Europeans, five or six Battalions of Sepoys, a company of sappers, and a Battery of Artillery armed either with rockets or mountain guns, but as they would not be required for some few weeks after the out-break of war, India would have plenty of time to make the necessary arrangements for their despatch.

The general plan of operations we have already sketched, and if we consider the temper of the Burmese towards us and their contemptible powers of resistance, there can be but little doubt, that within a very few months all but the more remote parts of the Burmese empire would be in our hands, and it would then be necessary to decide how the country should be occupied and held. This would of course to a great extent depend on the political measures adopted by Government, for annexation would require military dispositions very different to the temporary protection of a prince elevated by us to the throne. Before we go further, let us glance at the political aspects of the subject.

In the first place under what conditions should we invade Upper Burmah, and secondly what events are likely to bring about those conditions? A state of anarchy undoubtedly would cause us to interfere by arms, and that condition would certainly arise on the death of the present king. So many claimants are there to the throne and so many supporters have they one and all that a peaceable succession is impossible. Armed intervention will be the result, and according to prevalent opinion, a nominee of our own will be set up and the King of Burmah reduced to the status of a feudatory of the empire such as Scindia or the Nizam. Whether such a policy, in the case of Burmah, is preferable to open annexation is however a matter of opinion. Another condition that might induce a recourse to arms, would be arrogant conduct on the part of the Burmese Court such as proceeded and resulted in the Forsyth mission, or the discovery of intrigues with China directed against ourselves. In such a case it is difficult to conceive how we could adopt any other course, but annexation. Mere punitory measures would only embitter the relations be-

tween the two Governments, leave the country a prey to political and social disorder, and cause retaliatory measures to be taken against those who had assisted us, so that the last state of Burmah would be worse than the first.

Unhesitatingly we declare that in the event of war the only course open, is downright annexation. What are the objections thereto? *1st*—The extension of our already enormous empire, and the increased responsibility entailed. To that we can only reply that it is our manifest destiny, and that unless we accept it, the far East must remain plunged in hopeless barbarism for centuries yet to come, and the wealth of the Indo-chinese peninsula be lost to the world at large. *2nd*—That annexation would bring our frontiers conterminous with those of China, and that a buffer between the two empires would be for ever lost. True! but is this a disadvantage? We should gain a well defined frontier in the Salween and the mountains of Yunnan, we should be at last enabled to establish commerce and intercourse with Western China, and we should we submit be in a better position to meet a Chinese invasion than we now are. Consider the mountainous nature of Yunnan and the immense distances to be traversed, and we must admit that it would be impossible for a large army to descend en masse upon the plains of the Irrawaddy, it must arrive in detachments, so that practically the much vaunted buffer would be nothing more than an advanced base of operations for the Chinese army. Would it not be better to meet and attack the several detachments as they issued from the mountains, than to give them a fresh base, where they could assemble at their leisure and recruit their strength. *3rd*—That the numerous hill tribes would be a ceaseless annoyance and anxiety to us. Now surely it ought not to be more difficult to control these tribes than it is those of Assam and Orissa. Of course if we attempted to keep them in subjection by means of regular troops the expense would be enormous and the trouble endless, but on the other hand were we to expand the idea of local battalions, such as those already suggested, and were we to employ therein the more war-like races, the work would not only be cheaply done but efficiently executed, and there is no reason why a Panthay frontier force on the model of the Punjab force should not some day be created to keep our Eastern frontier in order. The Panthays are brave to a degree, witness their long struggle against the Chinese empire. They are Mahomedans, and religion and history both combine to inspire them with undying hate towards Chinese or Kakhys. Well drilled and disciplined, they would be formidable foes to both, and it is by means of such a force that the frontier should be guarded, and the hill tribes subject, *4th*—That fresh annexations would cause uneasiness in the native mind. In India who cares for Burmah? Would any Indian Rajah feel one whit the less secure because Mandalay had fallen and its king become a pensioner of Britain? Would the fate of the Burmese royal family excite sympathy in any Indian community? Or would the fanaticism of any sect be aroused? No! Indian life would flow on as smoothly and tranquilly as it would if Monaco were menaced by Italy

or annexed by France. Even in Burmah itself all would settle quietly down. Mandalay is Burmah, once it had fallen, there would be nothing left to serve as a focus of rebellion or rather resistance. There are no great families or powerful chiefs, so the king a prisoner, no one would remain to rally the broken and scattered bands of soldiery or to organize risings against the conqueror. The cultivator and the trader would welcome us, and the official class would become mere instruments in our hands, the judicial and fiscal officers of a new British province. 5th—That it would be but a door for further annexations, and that we should thus be embarking on a fresh tide of conquest. If so, so much the better for the lands that stretch between the Irrawaddy and the Pacific and so much the better for civilization. It cannot be, that the golder Chersonese of the ancients, is to remain for ever barbarous, uncivilized, unknown to the world, and unprofitable to the Human race.

So then, as the disadvantages attending annexation do not in any way seem to counterbalance the many powerful arguments in its favour, we propose to deal only with the case of complete annexation in treating of the military occupation of the country.

The first consideration would be the selection of the frontier, on that point however there can hardly be any two opinions. On the East the line of the Salween seems to offer every advantage and gives a clearly defined boundary line, while to the North a limit is already determined by nature and by man, for there the Chinese frontier is marked out by the lofty barrier which the mountains of Yunnan present to the country South and West of them. Our borders being fixed the next point to consider would be the protection of that frontier from external foes. From Tenasserim to Yunnan our borders would be conterminous with the Trans-Salween Shan states, and though it is not likely that they would show us any active hostility, still it would be advisable to establish one or two small stations along this line of frontier, perhaps one in Karennee and another somewhere near the Tacaw ferry so as to command the trade route to Kiang Hung, would be found suitable for this object. Karennee has an extremely healthy climate and is notorious for the lawlessness of its inhabitants, facts which suggest its suitability for European troops. With stations at or about the localities above named, the Tonghoo Garrison might be considerably reduced.

The Chinese frontier should be observed by Brigades at Theebo and Bhamo, so as to command the Theinni and Sanda trade routes into Yunnan, advanced posts being thrown out to Bodwayn and the Kakhyen Hills, in order to prevent the incursions of the hill tribes. Further North it might be advisable to establish a small station amongst the Khamti Shans, to preserve order in those distant valleys and to complete the line of frontier posts.

The internal security of the country is the next point for consideration, and that we think could be easily ensured. The Burmese will not offer much opposition to us, and our coming will be rather wel-

come than otherwise, so that for the control of the purely Burmese part of the country but few military stations will be required. Rangoon as the seaport and arsenal of the province will of course still require a strong Garrison, but Thyetmyo and Tonghoo if not abolished altogether as military posts, might safely be reduced to single Battalion stations. Above Thyetmyo, along the whole course of the Irrawaddy as far as Bhamo, we doubt if more than one military station will be requisite, that of course being at Mandalay where a strong Brigade should be concentrated. Up the Kyendwen valley it would be necessary to establish one or two military posts, one in the upper part of its course near the Assam frontier, to keep in order the Singhpous and the other tribes of the Patkoi mountains, the other in or about Kendat, a district adjacent to Munnipoor. These two posts would serve as bases of operations for expeditions against any of the hill races of North Western Burmah, besides giving us the command of the Kyendwen valley. Besides the stations above enumerated a few small detachments would have to be detailed for the more effectual control of the more savage districts, and these should certainly be furnished by the local battalions elsewhere recommended. The following table will show more clearly the proposed distribution of the force in the event of annexation. Of course it may be, that at first while the country is unsettled, more stations and a larger force will be necessary, but ultimately we opine the strength given will be found equal to all emergencies.

Distribution Table.

STATIONS OR DISTRICTS.					European Battalions.	Native Infantry.	Local Battalions.	Mountain Batteries.	Field Batteries.	Garrison Batteries.	Volunteer Corps.	Companies Sappers.
Rangoon	...	...	...	...	1	1½	...	...	...	2	1	1
Moulmein	...	...	...	...	...	...	...	...	...	...	1	...
Tonghoo	...	...	...	...	...	1	...	...	...	...	...	...
Karennee	...	...	...	...	...	...	...	...	...	...	...	...
Tacaw ferry	...	...	...	...	...	...	1	1	...	...	...	...
Theebo or Theinni valley	...	...	...	...	1	1	...	1	...	...	...	...
Bodwayn	...	...	...	...	...	...	1	...	...	...	...	...
Bhamo	...	...	...	...	1	1	...	1	...	1	...	...
Outposts along foot of Kakhyan hills	...	...	...	...	...	...	1	...	...	...	...	...
Khamti Shan district	...	...	...	...	...	1	1	...	...	...	...	...
Thyetmyo	...	...	...	...	...	1	...	...	...	...	...	...
Mandalay	...	...	...	...	1	2	...	...	1	1	...	...
Kendat	...	...	...	...	...	1	1	1	...	...	...	...
North Western Frontier	...	...	...	...	...	1	1	1	...	...	...	...
TOTAL		...	5	11	6	5	1	4	2	1	...	...

An increase on the establishment, proposed at page 19 for the British Burmah Division of :—

3 Battalions Europeans.
 6½ " Native Infantry.
 4 " Local troops.

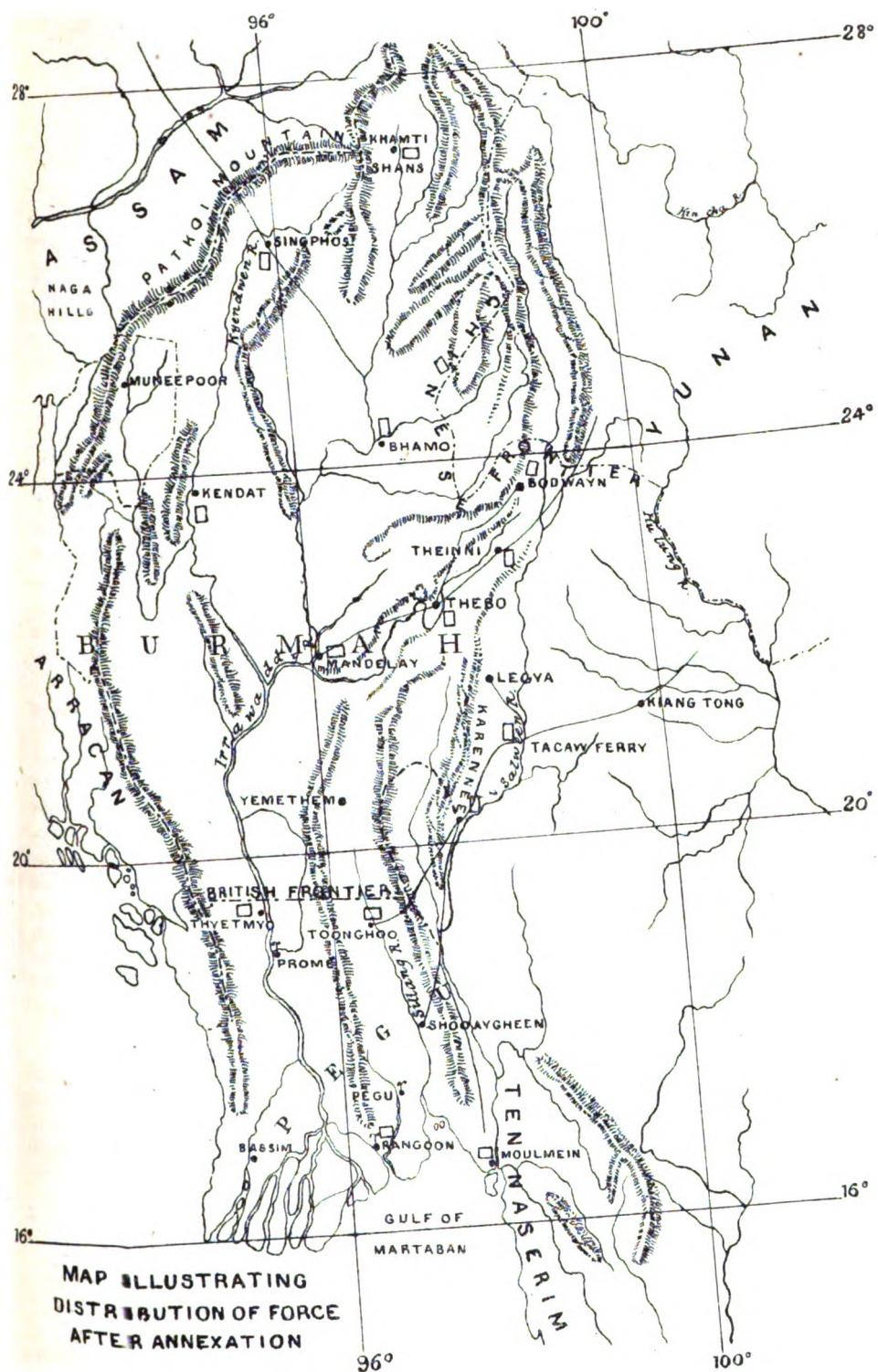
3 Batteries Mountain train.
2 " Garrison Artillery.

No great increase considering the extent of territory annexed, and the mighty interests involved. The addition of about 3,000 Europeans ought not to be an unbearable strain on our resources, while, as we have already indicated, with races like the Panthays at our disposal there would be no difficulty in raising local battalions, for the frontier force. So that, it would seem, that the augmentation of the Native Infantry would be the only real difficulty with which we should have to contend. Madras cannot well spare for any prolonged period so large a force as eleven battalions, but why should not such arrangements be made, that Bengal also should furnish its quota of Sepoys.

Then as to expense. Ourselves we are fully convinced that the resources of Burmah would be fully able to meet the additional cost imposed, but even were it not so, it must be remembered that as in the case of the Punjab it would be unjust to place the whole additional expense on the province itself. The Punjab and Burmah would then be respectively the Western and Eastern bulwarks of the empire and as such, the cost of their military occupation may be fairly extended to other provinces. If circumstances should compel our interference, annexation will we insist be found in every respect the most advantageous course and if annexation be the course adopted, we must arrange for the thorough defence of the province, cost what it may. In the preceding pages we have endeavoured to sketch firstly: a plan of invasion suitable to surrounding circumstances. Secondly: the steps necessary for a proper occupation of the country. On both these points there will of course be opinions the most conflicting, for the subject is one which admits of convictions widely different. Again we are well aware that few in India are likely to share our opinions regarding annexation. People in India judge the merits of the case entirely by an Indian standard, and without some acquaintance with Burmah it is impossible to recognize the favorable aspects of the course here recommended. The question of local battalions is also one which will meet with little favour, and the failure of our last attempt in that direction will be pointed out, but as we have already shown, we do not want smart showy battalions, but serviceable bodies of men with some military training, fit to cope with hill tribes, and suited to jungle warfare.

The suggestions we have propounded are intended rather to give a general idea of the subject, than to be considered as infallible precepts for the guidance of our military relations with Burmah. If the general principles inculcated are sound, it is enough. Details are so influenced by time and place, that it is impossible to lay them down with any certainty.

E. G. B.



VI.

RUSTCHUK.

The fortress of Rustchuk lies on the right bank of the Danube, below the mouth of the *Lom*, commanding the water way of the former river, it also closes the roads to Schumla, Varna, and to Tirnova, and the railway to Europe, (across the Danube to Guirgevo and thence to Rustchuk,)

* * * * *

Note. The latest works undertaken by the Turks are advance Starforts and shelter trenches, also the diversion of the railway from its exposed position on the river bank to a more retired one.

* * * * *

In material means of defence, the fortress is better provided than any of the other Danubian strongholds.

The town lies on the edge of a plateau rising towards the South, the clay precipices of which fall steeply into the Danube.

Below Rustchuk on the left bank lies the Roumanian town of Guirgevo, and between the two towns the river is divided by the island Churoy into two streams of which the broadest flows past Rustchuk.

The nucleus of the fortress consists of an uninterrupted rampart surrounding the land side, and of detached batteries on the waterside defending the town from the side of the Danube and *Lom*. In addition to the above, immediately in advance of the eastern front on the road to Siliestria, lies the great crown work constructed for the defence of the suburb which it surrounds.

The main rampart on the land side consists of 8 bastioned fronts, (9 small bastions) with very long curtains and flanks perpendicular to them. The profile is feeble with a dry ditch of 46" wide and 19' 6" deep. Both escarpes and counter scarpes are revetted with stone.

There is no glacis or other outwork except the one already mentioned on the east, which is on the same system as the enceinte and consists of 3 full and one demi bastion.

On the land front there are four (4) exits into the country.

All the communications on the river bank are covered by small earth works.

The terminus of the railway lies before the crown work, and from here the line runs in a deep cutting up to the point of intersection with the Road to Siliestria.

On the declaration of war the line and station were shifted so as to be under cover.

A line of detached works surrounds the land side at a distance of 1000 paces.

On the commanding Southern heights are placed the Star forts U'ydjeler and Kiérkapí, a little more to the East 5 earthworks, in the centre is placed on a commanding height near the Schumla road the strong fort, "Levant" a star fort of considerable size, and further to the east, 3 square and one hexagonal redoubt of which the chief is the strong fort of Chanamdge to the North of which runs the new branch of the railway.

The works on the Southern side are commanded by the ground further to the South.

Regarding the present armament of the fortress nothing is known for certain.

The main rampart it is believed has only 85 guns of which many are of heavy calibre. The fort "Levant" is said to have 17 guns of 23 centimetre calibre.

* * *

(The rest of the details about armament and garrison are only taken from the "Times".)

The weakest point of the fortress lies in the dearth of bombproofs under the rampart, and in the short distance to which works have been pushed out, this latter the Turks are trying to remedy by the construction of advanced field works.

*Translated from No. 132. Russian Invalid by F. N. Maude
Lieut. R. E.*

VII.

TRANSLATION FROM THE " INVALIDE RUSSE."

No. 120, 6TH JUNE 1877.

Present state of Entrenched Camp of Kars.

The Fortress of Kars, is situated on the high and rocky plateau of Karadaga, one of the spurs of the "Sagauloogckago" ridge.

Strong by its situation, closing the valley of the Kars, and Chai, and on the direct road from our Frontier to Erzeroum, its importance has always been recognised by the Turks as being the key to the defence of Asia Minor.

Since 1865 in particular the Turks have directed their attention to the strengthening of the zone adjacent to the Transcaucasian Frontier, by the erection of extensive fortifications of strong profile : in this scheme Kars has also been included.

The rocky nature of the soil renders the erection of fortifications extremely difficult. Earth for the parapets in many cases has to be brought from a considerable distance, whilst the excavation of ditches is excessively arduous : in consequence of the difficulties and in view of the vast number of hands required for the execution of the projected works the Government had recourse to obligatory labour and did not hesitate to incur considerable expense in carrying out it's object.

The labourers were annually collected from the localities surrounding Kars, being employed from April to November and receiving pay at the rate of from 20 to 24 Kopecks a day.

In laying out the present lines the Turks have availed themselves to a considerable degree of the experiences of the campaign of 54 and 55, during which Kars was blockaded, assaulted, and finally occupied by our Troops. Of the works constructed during that campaign scarcely a trace remains, but the recently erected entrenchments occupy nearly the same positions, and in many cases retain the old names.

The chief difference consists in their better adaptation for mutual defence, in their stronger profiles and in their more permanent character, some of them even being provided with casemated cover.

According to latest intelligence the Fortress of Kars consists of the restored citadel and 12 separate groups of entrenchments : the old town wall is half destroyed and has lost all value as a defensive work.

The steep and rocky defile of the Kars—chai, divides the system of outlying works into two sections, *viz* :—those on the right and those

on the left bank, the communication between which is kept up by foot-paths pierced in the rock and crossing the river by 3 stone bridges. Despite this separation many of the Forts on either bank afford each other mutual defence.

No. 1, *Arab or Karapatlak Redoubt.*

The system on the right bank consists of the following works. No. 1. On the top of the Karadaga and 2,300 yards from the North East of the citadel lies the work known as the Arab or Karapatlak.

It's trace is irregular: the gorge is closed by a masonry barrack (bomb proof): its left face rests on the high and precipitous bank of the Kars-chai, sweeping the approaches along the valley, commanding the Inglis redoubt on the left bank of the river, to which it affords flank defence.

In front of it's right face and parallel to it lies an outwork: the earth for the whole, including the glacis by which it is surrounded and which is adapted for both artillery and small arm defence, had to be brought from a distance.

The dimensions of the profiles are :—

Command	... 14 feet.
Thickness of parapet of main work	... 40 "
Do. advance work	... 37 "
Breadth of terreplein	... 32 "

No ditches; no traverses.

At the right extremity of the main rampart and under the parapet there is a small powder magazine.

The length of the crest line of the main rampart is 606 paces: that of the outwork 312.

No. 2 *Karadaga Redoubt.*

No. 2 or Karadaga Redoubt lies 1205 yds. to the S. E. of No. 1 and consists of a sharp salient cut off at the angle; of two Auxiliary parapets, and of an elevated Battery, known as the "Liaret" placed behind the main work: it was intended to close the gorge by a masonry Barrack: there are no ditches owing to the impossibility of excavating them in the rocky ground.

The dimensions are as follows :—

Command	... 9 to 12 feet.
Thickness	... 21 to 24 "
Length of crest Line	... 1518 paces.

Expense magazines.—Two, one in the reverse slope of outer rampart, the other at the end of the right face of the main rampart under the parapet.

The Battery "Liaret" is built on a square masonry foundation, 21 feet high : the side of the square being 65 paces. There is one expense magazine. This Battery overlooks No. 2.

No. 3 Chafiz Pasha Redoubt.

No. 3 or Chafiz Pasha Redoubt lies on a level spot 1890 yards from No. 2, and is of bastion trace, with traverses on the rampart and in the covered way.

Its dimensions are :—

Exterior side	...	... 266 yards
Command	...	... 9 feet
Thickness of parapet	...	... 21 feet.

Depth of ditch unknown, but work has recently been going on in it.

Length of Crest-Line 1584 paces. In the interior of the entrenchment there is a stone barrack and an expense powder magazine.

One exit through the curtain facing the town.

In front of the South East Bastion and 230 yards in advance, lies the "flèche" "Echalli," having faces 77 yards long.

No. 4 Kanloe Entrenchment.

No 4, Kanloe entrenchment 3100 yards from No. 2, consists of three separate works :—

Two advanced redoubts with "reduits," having the appearance of Lunettes closed at the gorge with masonry Barracks : with auxiliarly bastioned lines in rear, which are provided with Ravelins.

It was intended to surround the whole with one ditch.

The covered way is traversed. An expense powder magazine is placed in each lunette.

The Crest-line 2,163 paces, dimensions are.

Profile of chief lunettes :

Command	...	21	feet.
Thickness	...	24	"
Width of terrepleine including banquette	...	42	"
Upper width of ditches	...	12	"
Depth of ditches	...	6	"

The profile of the Auxiliary Lines is much weaker.

No. 5, Soovary Entrenchments.

No. 5 or Soovary Entrenchments 1,700 yards west of No. 4, is placed on the same site as that occupied in 1855.

The works on the left bank are as follows :—

No. 6, Battery Tchime or Ted-Charat.

No. 6, Battery Tchime or Ted-Charat is designed to sweep the valley of the Kars Tchai above the Town, was built of brought up earth, and has no ditch. 57 paces in front of the Battery a glacis has been erected, and under the parapet of its left flank there is a bomb proof powder magazine having the following dimensions.

Length	... 17	feet.
Breadth	... 13	"
Height-crown of arch	... 9½	"

Dimensions of profile of work.

Command	9½ to ... 12	feet.
Thickness	... 18	"

No. 7, Veli Pasha Redoubt.

No. 7 or Veli Pasha Redoubt lies 1150 yards from No. 6 and about 850 from the citadel, it is a closed work, three faces of which are of bastion trace, whilst the 4th forming the gorge and facing the citadel is closed by a stone barrack and defensive wall.

The exterior side of each of the bastioned fronts is 107 yards long, the flanks are 65 yards long : the dimensions are.

Command	... 24	feet.
Thickness	... 28	"

The exterior slope of the parapet is $\frac{2}{3}$.

Upper width of ditch	... 21	feet.
Depth of ditch	... 7	"
Crest Line	... 33½	paces.

There are two exits, one through the barrack, and the other through the curtain by a cutting leading into the ditch.

The Bastions are made of brought up earth, and there is no ditch before the left face of the work.

The glacis is for small arm defence only.

The existence of a powder magazine at the flank of the work may be presumed.

No. 8 or Inglis Redoubt.

No. 8 or Inglis redoubt lies 1860 yards from No. 7 and 1420 yards from the "Arab Tabia" on the right bank : it is an irregular closed work, with an exit on the South West side : it is adapted for small arm defence only : the earth was entirely taken from the ditch.

The dimensions are :—

Command	... 9	feet.
Thickness	... 14	"
Upper width of ditch	... 21	"
Depth of "	... 7	"
Crest Line	... 262	paces long.

No. 9, or Moothlis Redoubt.

No. 9 or Moothlis Redoubt lies 1240 yards to the North East of No. 8, and 1200 yards from the "Arab Tabia" and has been but recently erected : it is of irregular trace with open gorge and is situated on the brink of a precipice, with the object of firing on the approaches leading from the ravine of the Kars Tchai to the Tchakmakh plateau. The rampart has both terreplein and banquette.

The dimensions are :—

Command	... 9½	feet.
Thickness	... 21	"
Length of Crest Line	... 429	paces.

On the plateau, some 700 feet in advance of this redoubt an auxiliary work, "Koltok" is projected.

No. 10 or Laz-Tepece or Tchachmach Redoubt.

No. 10 : Laz-Tepece or Tchachmach Redoubt is situated on a small rocky plateau with sudden slopes, and commands all the surrounding localities : it consists of three separate batteries, of which the centre one projects beyond the general alignment : all the batteries are surrounded by the same glacis, which is adapted for small arm defence only.

The dimensions are.

Command	... 12	feet.
Thickness	... 24	"
Front of flank Batteries	... 266	"
" " Centre "	... 238	"

No. 11 or Tich-Tepece Redoubt.

No. 11 or Tich Tepece Redoubt lies 1330 yards to the South of No. 10, and is second in point of elevation : it has a bastion trace with truncated salients : there is one exit in the face turned towards No. 10: there is no glacis : in the interior there is an expense powder magazine.

The dimensions are :—

Command	... 12	feet.
Thickness	... 12	"
Upper width of ditch	... 9	"
Depth of	... 7	"
Length of Crest Line	... 520	paces.

For the defence of the North Eastern approaches there is a Battery called the "Ai Tabia" at a distance of 49 feet from it, having a length, including front and flanks of 200 feet : this Battery has no ditch.

No. 12 or Techmas Redoubt.

No. 12, Techmas Redoubt lies 600 yards from 11 ; and consists of two bastioned entrenchments connected with one another along the line of front : it has one exit facing the citadel : in the interior there is a masonry barrack and an expense powder magazine.

Profile, same as No.	... 11	"
Length of Crest Line	... 780	paces.

In all the above works the parapets consist of earth and mortar : the slopes are kept as steep as possible, whilst in many places the ditches are scarped : the parapets are revetted with turf, and the posterns and gorges, with stone.

The Line of defence of the Camp of Kars, inclusive of the works on Shorachskia Hill, which may be considered as forming part of the outworks, is about 10 miles. It was proposed to unite all the works by a continuos rampart, which, without doubt, would have weakened their defensive power considerably.

The Citadel.

The citadel is situated on the western, narrow and rocky, extremity of the Karadaga Hill, the sides of which fall perpendicularly into the ravine of the Kars Tchai.

It occupies about 300 yards along the crest, it consists of a high brick wall on a rubble foundation, of which the longer side, turned towards the Town, has the trace of a blunt re-entering angle, whilst the opposite side is a straight line : each face of the re-entering angle is

crowned by 2 demi-turrets, whilst in the interior there are 2 full turrets.

At the back of the North Eastern turret, is placed a powder magazine, there is only one gate. The best approach is from the east : on the west and S. W. there are precipitous rocks : on the Town side the slope, although steep, has the best road, by which the citadel is supplied with all necessities.

Besides the above mentioned barracks and powder magazines, Kars contains the following casemated buildings : magazine for stores in time of war, in rear of No. 3. Five separate powder magazines : 2 in rear of No. 3. a third in rear of No. 4, dug into the steep right bank of the river ; 4th and 5th in rear of No. 7, on the left bank.

Both Barracks and Powder magazines are built of rough stone set in mortar, with walls 4 feet thick, arched roofs, covered with a thick layer of earth : the walls are exposed *i. e.*, not masked with earth.

Armament.

The normal Armament, which ought to consist of 150 guns, is at present viz :—

100 Rifled 24 prs, chiefly M. L. 54 S. B. 24 prs.

Garrison.

Judging by the length of the fire Line which, exclusive of the space for guns (amounting to 1575 yards) is 5992 yards, the garrison should be 23,000 men, but taking into consideration the extent of the works and their distance apart we may assume that this number is too small. Examining the works from the point of view of attack and defence, we may come to the following conclusions. Their advantages consist in.

1st. The favourable disposition of the heights commanding the surrounding locality.

2nd. The strong mutual defence by Artillery.

3rd. The rocky ground, impeding the execution of siege works.

On the other hand its disadvantages are.

1st. The ravine of the Kars Tchai and the too great extent of the Line of defence.

2nd. Absence of ditches in some of the forts.

3rd. Difficulty of repairing parapets through want of earth.

4th. Absence, in some cases, of flank defence to ditches.

5th. Want of casemated cover for the defence of the garrison and stores: the barracks can only contain 3000 men, whilst the magazines could not hold more than 100 tons of wheat, which will not suffice for more than a month's consumption of the garrison.

6th. Absence of water in almost all the works, combined with the difficulty of procuring it from the Kars Tchai.

7th. Absence of casemated traverses and small number of earthern ones.

8. Exposure to fire of the detached powder magazines.

To the above we must add that the defence of Kars is rendered more difficult by the considerable civil population of the town which in case of blockade or siege will require a part of the provisions of the Garrison.

*Translated by F. N. Maude,
Lieut. R. E.*

VIII.

THE NATURAL LINES OF DEFENCE OF EUROPEAN
TURKEY.

TRANSLATED FROM NOS. 37 AND 39, (PUBLISHED 9TH AND 16TH MAY
1877) OF THE "MILITAR WOCHENBLATT"

by Captain R. Elias, 59th Regiment.

I.—THE LINE OF THE DANUBE.

To a Russian army invading Turkey, the Danube and the Balkans oppose two natural barriers. Moreover the first line is strengthened by the fortresses of Widin, Nikopolis, Rustchuk, Turtukai, Siliestria, Rassova, Hirsova, Matchin, Isakchi and Tultcha, as well as by the Danube flotilla. *General character of the River.* If we follow the course of that part of the river which concerns the present war, we find the stream between Golobrach and Gladova (or Kladova) winding, for a distance of about 50 miles, with many bends, through a bed of rocks. At the first of these points where stands an old Servian Castle the river is 1600-1700 yards broad, and is then suddenly compressed by the rocky banks into a width of a few hundred paces, continuing its course with a very swift current. At several points, especially at Bilnitz and the Iron gates, the stream is thus narrowed and shut in by rocks ; these are visible when the water is low, but when the river rises they cause deep whirlpools, endanger the navigation, and render a crossing almost impossible. Here are situated the Turkish fortresses Orsova (Ada Kalsh) and Gladova (Fetch Islam). On both banks the ground is uncultivated, thickly wooded, hilly, and generally inaccessible. Below the Iron gates the character of the river changes ; the mountains begin to recede just below where the Timok flows in, and the Danube rolls on uninterrupted right away to the Black Sea. The Bulgarian bank rises steep and high, but the left bank is nearly everywhere flat and marshy ; on this bank also are many wide—spread water-meadows, all flooded over on the least rising of the river. The nearer we approach the mouth the broader becomes the stream, the islands increase in number, and the Roumanian bank becomes more and more marshy. Below Rustchuk there is a point where the left bank, although flat, is dry, and the ground firm ; and here the river is not cut up by islands. Opposite Siliestria there is a road passable at all seasons from Kalarach to the Danube. In the Dobrudschia the right

*Authorities :—*Field Marshall v. Moltke's "Reisebeschreibung." "Russian Wars with Turkey" by Major Russell ; numerous newspapers and private sources.

bank as before dominates the left, but the latter as far as the Bortica arm is firm and dry. At this part there are several swampy islands, covered with trees and bushes, which are always flooded over when the river is high. At Hirsova the bed of the stream narrows, forming a fair crossing place. About Braila the left bank begins to command the right ; muddy -terraces rise abruptly to a height of 80-100 feet, while the hills on the right bank recede to a distance of from 3-5 miles. Roads from Braila and Galatz to Matchin are practicable only in fine weather, and they are commanded by the Matchin and Betchepa hills nearly 1000 feet high. Below Isaktchi the Danube branches into a delta of 3 arms which flow into the Black Sea, only the centre arm (Sulina) of which is really navigable. The Northern and Southern arms are swampy, and covered with reeds and rushes 10 feet high, so that only the rigging of ships is visible above them.

The width of the river varies greatly in different places : from 400-1700 yards. Near the ruins of Fort Elizabeth above new Orsova it is 900 yards ; at Turn-Severin 900 yards ; at the village of Korbow, on the island of that name (1200 yards below Turn-Severin) 450 yards ; at Widin 700-900 yards ; at the junction of the Schyl 1000 ; at Nikopolis 950 ; at the junction of the Aluta 600 ; near Rustchuk and Siliestria 900-1000, at Braila 800 ; at Galatz 700 ; at Reni 450 ; Between Isaktchi and Ismaila 330-1300 ; in the Kilia (or Northern) arm of the delta 330-800 ; in the Tulbcha (or Southern) arm 250-650 ; and in the Sulina arm 240 yards.

The depth of the Danube is, on an average, 15-20 feet. At the Iron gates, with an ordinary amount of water in the river, about 5 feet ; but here also the depth varies very much, according to the character of the river bed. When the river is low the rock " Prigrada" shows above the water, while further up, rocks quite as high remain covered by 2½ feet of water, because the stream is so much dammed up there. Just below the " Prigrada" rock we find large holes, some of them 150 feet deep. From the Iron gates to the island of Korbow the average depth is 18 feet, and thence to the junction of the Aluta 10-15 feet, but varying greatly. At low water islands and sandbanks are visible in many places. From the Aluta to Sistova the depth is 10-20 feet. Near Sistova there are shallow places dangerous to navigation ; and near Tultcha the river is obstructed by a large sandbank, leaving a navigable channel only 14 or 15 feet in width. At this spot a bridge might be thrown across, were it not that the approach to the left bank is inaccessible on account of wide-spread swamps and reed-covered marshy islands.

The rate of current is on an average from 2-3 feet per second ; but in the Iron Gates 7½ feet.

The bed of the river is formed for the most part of fine sand mixed with mud and earth ; where the hills come close down to the

bank there are also found tracts of stony ground. Below Orsova is the well known cataract of the Iron Gates. It is formed by a bank of rocks (a continuation of the Carpathian ridge) running right across the bed of the river; this bank of cliffs or rocks has two distinct forms: the side up stream is a tolerably smooth ridge, in breadth extending across the whole stream, and in length about 45 yards; this dams up the water, and is usually covered by only 1 or 2, never more than 5 feet of water, so that the navigation there is extremely precarious, and in order not to be quite so dependent on the rise and fall of the river, and always to have a passable channel, blasting operations have, from time to time, been going on there for years. The side down stream is formed by a mass of unconnected reefs and ridges extending over about 270 yards (lengthways). The above mentioned rocky bank "Prigrada" is situated here.

There are two regular high water periods; one in the spring, the other in the autumn. The former, in May and June, lasts from 2-3 weeks when the low lying lands on the left bank are often flooded for miles and remain impassable for four weeks after the water has gone down. The autumn high water period is shorter. The river is at its lowest from about the middle of September to the middle of October. The Danube is not frozen over every year, and requires at least 6-8 degrees Reaumur lasting several days to freeze it. It is navigable everywhere from Widin downwards for steamers and sailing vessels; sea going ships go up as far as Braila, and, when there is plenty of water, to Rustchuk. From December to March the navigation is generally interrupted.

From Pesth downwards there is no bridge over the river: of the massive bridge formerly built by Trajan near Gladova the land supports, and a tower on the Roumanian side are the only remains. The passage of the river must be made by the local steamers, or by pontoons, bridges of boats &c.

As in most places the right bank dominates the left, favourable tactical points of passage are mostly on the Turkish side. The best from the right to the left bank are at Orsova, Widin (if Kalafat can be used as a *tête du pont*), Nikopolis, Sistova, Rustchuk, Turtukai, Silistra, Hirsova, Matchin, Tultcha and Isakchi; from the left to the right bank Turn Severin, Turtukai, Braila (N. of the town), Galatz, where the Sereth may be used with advantage to make preparations for throwing a bridge. At Ismaila the passage to the right bank of the Kilia arm may be made without difficulty, but there is swampy ground between the Kilia and Tultcha arms, and to force a passage over the latter in the face of the Tultcha fortifications would offer considerable difficulties to an enemy.

Communications.—To an army advancing through Roumania the following approaches are available: the Roumanian road (a narrow one,

with branches about every 18 miles); this leads from Galatz *vid* Bucharest, parallel to the Danube as far as Tschernetz; out of it run practicable roads from Tschernetz and Krajova to Kalafat; from Krajova and Slatina by Karakal to Islach opposite Nikopolis; from Piteschi by Tekutchi and Rusvede to Turnu, also opposite Nikopolis; from Turnu a road runs parallel to the Danube by Simnitzia to Giurgevo, opposite Rustchuk; out of this road leads another from Rusvede to Alexandria. From Bucharest there is a railway as well as a road to Giurgevo, and a road to Oltenitzia, opposite Turtukai. Three roads which are passable only in dry weather lead from Braila and Bucharest to Kalarach, opposite Silistria. To the North of the Dobrudscha good roads lead to Reni-Tutschkoff and Kilia, also from Reni to Galatz.

In Turkish territory there is a fairly good road from Widin to Saitchar, also one cut in many places through rock, running parallel to the Danube, to Azer Palanka, Lom Palanka, Rahova, Nikopolis, Sistova, Rustchuk, Turtukai, Silistria, from this are several branch roads, further, from Rahova to Wraza, and by Plevna to Lovatz; from Rustchuk, rail and road *vid* Rasgrad to Schumla, and Varna; a road from Silistria to Schumla and another leading into the Schumla—Varna road. The following roads are passable only in fine weather: Milkovatz to Widin and Rahova; Lovatz to Nikopolis; from Tirnova to Sistova and Rustchuk; Rasgrad to Turtukai and Silistria. The same may be said of the roads from Medschidich *vid* Hirsova to Matchin and Tultcha. A railway unites Kustendje with Tchernavoda.

Fortresses.—Towards the end of last year, when a collision between Turkey and Russia seemed almost unavoidable, the Porte assembled a commission consisting of the chief of the staff &c. which was charged to cause a minute inspection to be made by artillery and engineer officers of the fortresses of Varna, Schumla, Rustchuk, Widin and Silistria. The commission had authority to commence at once any necessary improvements, and to lay before the Commander-in-Chief projects for new fortifications. The result of the inspection was not encouraging. Even where the fortifications could be repaired with tolerable facility, in spite of the neglect they had suffered during a long period of peace; their position and profile were quite unfitted to withstand modern rifled artillery. In many of the outworks the surrounding country gave to the enemy a command both of sight and of direct fire. In the enceintes many traverses had to be made in order to guard against ricochet fire; every where there was a want of interior space for men, ammunition and provisions, and, although powder was plentiful, the artillery material generally was bad, and in insufficient quantity. Widin and Silistria were accounted the strongest places, but to hold them it was judged necessary to take and to keep Kalafat and Kalarach, as bridge-heads on the Roumanian bank. Kalafat is only 2,900 yards from the enciente of Widin and commands it, so that the possession of the former is indispensable to the defence of the latter. As a step towards this seized

and occupation 150 Turkish ships were collected near Widin, and kept under military supervision.

The fortifications of Widin.—On the land side, one in the form of two concentric arcs : the outer of these, which encloses the old town, is an ordinary earthen rampart 3 metres high and 4 metres broad, with a ditch 3 metres deep ; the rampart is flanked by eleven redoubts 5-600 metres apart, and each mounting 6 guns. The redoubts on the flanks (Forts Feldis and Adjap) rest on the Danube, are stronger than the others, and have their escarp revetted. The inner arc is so constructed that the bank of the river forms its chord ; on the land side are seven bastions with masonry escarp and counterscarps. Between the two arcs is a large space partly built over with houses, which in default of detached works in advance has often been used as an entrenched camp.

The erection of traverses was immediately commenced in the outer enceinte. In the absence of a covered way, and a glacis being out of the question on account of the low relief of the rampart, a *chemin des Rondes* was cut in the counterscarp. The powder magazines were rendered as far as possible bombproof by coverings of earth and traverses. The ground in front of Widin is swampy, and can be inundated to a height of about 4-70 metres. The wall (5-6 metres high) of the enceinte towards the Danube is entirely uncovered ; the inner wall is crenellated on the top, and there are 5 posterns leading to the foot of the rampart.

Rustchuk, the next large fortress down the river possesses all the more strategical importance from the fact, that here and at Giurjevo the Roumanian and Turkish roads meet. The fortress is on a plateau about 12 metres above the Danube. The enceinte is on the ordinary bastioned system with ditch and revetted counterscarp (except on the side facing the river). Since 1854 it has been extended across the Lom river and takes in the edge of the plateau between the Danube and left bank of the Lom. The fortifications have therefore the form of a right angled triangle, the hypotenuse of which consists of 6 bastioned and very irregular fronts, and is washed by the Danube ; the smaller of the other two sides follows the heights, and the greater, which is the probable front of attack, faces, towards the plain. In two angles of the triangle are situated the West Fort and the Citadel, the latter a bastioned work. The hypotenuse is broken outwards. One of the bastions, Kaleh-Alik-Tabia, forms a regular salient place of arms in the bed of the stream. Redoubts had formerly been built on both banks of the Lom to secure the town from the South, and the right angle of the enceinte was covered by a lunette.

Rustchuk appeared at any rate able to make an energetic defence, and not only were 3 new outworks erected in a short time, but also the powder magazine was secured by a covering of earth, sheltered store rooms for shells made, and places for filling them, and barracks for the

troops. Covered communications through the principal traverses were begun, and, if time allowed, similar communications were to be made along the ramparts. Fort Sary Bair, on the highest point of the margin of the plateau, is the key of the Rustchuk fortifications; from it the town and detached works are commanded. The earthy (and not rocky) nature of the ground and its nearly flat surface on the South East side of the fort greatly favour the opening of trenches there. All the Rustchuk works are connected by Subterranean telegraph.

The third considerable fortress on the Danube is Silistria. The town is situated on a gently sloping plateau, but is commanded from the South. The enceinte 600 metres in extent, and in form a semicircle, consists of ten regular bastioned fronts; four of these, three of which are nearly in a straight line, are protected by the Danube, and connected by several works with the river; a bend of the Danube partially covers three other fronts, while the remaining three are commanded by the heights in front; to counteract this disadvantage some detached works were built on the South side in 1853, the strongest of which is an earthwork with casemated reduit, detached escarp, and caponière. These works, built by Blum Pacha have already once opposed a successful resistance to the Russians. A series of earthen lunettes and batteries form a kind of citadel. On the whole the fortifications were in fair order, but a bridge-head was wanting. The improvements went no further than the re-establishment and strengthening of parapets and the erection of traverses. If the Turks could succeed in a timely seizure of the bridge-head on the left bank of the river, and in properly arming it, Silistria ought to be well able to defend itself.

Fortifications of less importance than the above, but which would nevertheless offer considerable obstacles to a passage of the river, are those at Nikopolis, Turtukai, Rassova, Hirsova, Matchin, Isakchi and Tultcha.

Schumla and Varna may be classed as places of reserve to the line of the Danube, but as they belong more particularly to the defence of the Balkan line, they will be treated of under that head.

During the months of April and May of this year the Porte made all possible efforts to equip the above mentioned fortresses with artillery material in every way suitable to the requirements of modern warfare, and it may be assumed that their armament was completed about the time operations were commenced.

The army of the Danube.—The number of regular troops for the defence of the line of the Danube may be reckoned at about 200,000 men including the garrisons. At first this force was distributed, apparently with a view to subsistence, from Widin to Tultcha, and in depth as far back as the Balkans, with reserves in course of formation at Adrianople and Constantinople, seemingly without any regard to stra-

tegic formation. Later on it was largely concentrated in the neighbourhoods of Widin, Rustchuk and Schumla. As regards the Garrisons, the following numbers are required :—

For Widin	... 15,000 men.
" Rustchuk	... 12,000 "
" Siliestria	... 12,000 "
" Varna	... 15,000 "
" Schumla	... 20,000 "
" Smaller fortified places	... 30,000 "
TOTAL	... 104,000 "

This leaves for the field army only about 90—100,000 regular troops. No account is taken here of the irregulars.

The fleet, created by the former Sultan, Abdul Aziz, deserves special mention. At the end of March 1877, the Danube flotilla consisted of 17 war vessels, with 60 guns, and was commanded by Vice Admiral Hassain Pacha; later on, these were reinforced by two monitors, and four ironclad corvettes sent from Constantinople to Sulina. Of the above mentioned 17, two corvettes remained at the mouth of the Sulina branch, 2 large gunboats near Matchin, and 2 smaller ones at Tultcha. The remainder were so distributed up the stream that in the course of 6 or 8 hours, two could always meet and support each other.

II.—THE LINE OF THE BALKANS,

Mountain ranges, the chief of which is the Balkan (or Hœmus) range, run right across European Turkey from the Adriatic to the Black Sea. South of Varna the Balkans rise to a height of 3—5,000 feet, and in the West terminate South West of Sophia. The main range forms a ridge to the North and South of which run parallel ridges. These are the great Balkans, and the so-called little Balkans in the North, bounded by the valley of Pravady and Varna; and the little Balkans in the South, between the Aidos valley and the Nadir; a higher mass between Aidos and the Rusacastro, a small river running East into the Black Sea, which forms a considerable lake before debouching; and lastly the high hills between the Rusacastro and Fort Karaburna.

In most parts we find many pointed eminences and much wood; large masses of rock are seen only in the valleys. The slope is much steeper on the South than on the North side, where many spurs jutting out graduate the transition into the Bulgarian plain. These spurs have a different character to the main range, being flat on the top, and split up by precipitous chasms, falling perpendicularly from 10—200 feet.

These plateaus are accessible only in certain parts, and they are mostly covered with a growth of low, thick brushwood, rather difficult to get along in. The roads, or tracks, are clayey, and in wet weather very hard to travel over and the boundless expanse covered with small oak shrubs forbids a march acrosss country. The Balkans terminate in the East in a rocky promontory, falling almost perpendicularly into the Sea, the easternmost point of which is Cape Emineh.

The Balkans have chiefly a limestone formation, but here and there are masses of rock, evidence of former volcanic action. The whole range is very thinly populated, and even in the valleys we find nothing but insignificant villages. The only mode of transport is by pack animals, and an army going over the Balkans must improve the roads in advance. Bulgaria has been called the corn-field of Turkey, but from the state of war that Turkey has been in for the last two years, Bulgaria is scarcely in a position to feed an army.

Good lines for crossing are :

1. From Plevna and Lovatz by Edroboi to Sophia.
2. From Tirnova by Gabrova through the valley of the Jantra to Kasanlik.

The castle of Tirnova, surrounded as it is by the Jantra, guards this line of road. Further into the mountains, near Gabrova the stream is crossed by a stone bridge. The road ascends through magnificent beech woods to the Schipka pass, then makes a steep descent to the village of Schipka, whence it leads into the valley of Kasanlik. This valley is remarkably beautiful and fertile; the stream is bordered by avenues of nut trees, and woods, orchards and cornfields cover the whole district.

3. From Tirnova to Osman Bazar, and thence by Kasan to Slivno and Karnabad. Kasan is a small town, lying in a deep basin. From here the road leads through a narrow rocky defile, called Denir Kapu (iron gate), on account of the difficulty of forcing it in face of an enemy; it can however be turned by a very bad zig-zag road to Slivno.

On the other side of the Denir Kapu (North) the road bifurcates, one branch leading to Karnabad, the other to Dobroll; both wind through deep wooded valleys, and one difficult to pass. As soon as the heights are passed, and the descent to Slivno begins the difference of climate is apparent; olive trees and cotton fields delight the eye, and while the slopes on the Bulgarian side are white with snow, those on the South side are beautifully green.

4. From Schumla to Tchalikavak, Dobroll, Karnabad. This road as far as Tchalikavak, where there is a fine encamping ground,

would be easily passed where it not for the strategic importance of Schumla ; the march on to Dobroll is not so easy, the road leading through deep cuttings, and between precipitous walls of rock ; some trenches also have been made to defend it ; it then falls steeply down to Deli Kamtschik through a long and easily defended defile. From Karnabad the road leads through the equally difficult defile of Bujuk Derbend.

5. From Kosladschi to Pravady, Jenikor to Aidos.

The little town of Pravady is built on a rocky plateau about 900 yards broad, and 2-3 miles long. The small river, Pravady opens a way southward through the mountains ; but the road is commanded by a rocky eminence, forming a natural fortress, which rises up in the middle of the plateau : but here also a detour is open, by Jenikor, or by a road called the pass of 40 fords, because it continually passes over brooks. Both these roads join on the heights in a district free from wood, and offering considerable defensive advantages.

6. From Varna by Dervisch-jovanu to Burgas and Missivri. Roads bordered by woods lead from Varna with a gentle ascent over the heights which terminate in the promontory Galata Burnu, on the sea. At the village of Podbaschi the Kamtschik (40 yards broad) is crossed by a pontoon bridge. In 1827 both here and on the other side of the valley the Turks made field works. Narrow tracks lead from here to Burgas and Missivri ; the slope is gentle, and on both sides there are thick, leafy woods which quite prevent any deployment of troops, so that these roads are in reality defiles. Less passable roads lead from Lovatz to Korbova, and by Seivi to Gabrova, lastly from Berkovatz to Pirot and Sophia.

There are no lateral communications in the mountains between these roads ; only in the valley of Kasanlik and between Missivri and Burgas to Aidos, between Karnabad and Slivno, are these to be found.

For a Russian army in Bessarabia the passes 4, 5 and 6 would be of the greatest importance ; but an active force based upon Aidos might successfully oppose each column as it debouched from the mountains ; also as long as Schumla and Varna, or only one of these fortresses, remained in the hands of the Turks, a passage of the Balkans would always be a hazardous undertaking.

The fortress of Schumla, South of the Rustchuk, and Varna road is situated on a wooded height, separated by a narrow valley from the main range of the Balkans. On the Bulgarian side the plateau terminates abruptly, with an almost perpendicular fall, the slope lower down becomes gradually gentler, forming altogether a natural fortress ; but the fortress and camp by no means completely close the

approach to the Balkans, as the latter also lies at the foot of the above mentioned isolated height in advance of the Balkans and can be turned. The town is built on a broad ledge in the slope, and has a bastioned enceinte. Four forts were formerly built by Sultan Mahmoud II. viz :— fort Tildis, about 2000 yards N. of the town, fort Tehalli N., and fort Feday S. of the chaussée leading to Varna, both about 2000 or 2500 yards from the town, and fort Tchengell about the same distance S. of the town. In 1853-4 these works were found to be insufficient, and a series of earth-works, as an auxiliary line of defence, was thrown up. In 1871, in addition to these, two massive forts were commenced, but were not finished at the end of last year, but it is probable that they have since been completed and armed, they are permanent fortifications with masonry escarpments and casemated galleries. For the garrison of Schumla 20,000 men are required, and for some time the Porte has taken care to have at least that number available ; In May there were about 22,000 regular troops there, viz : 14 battalions infantry, 1 regiment cavalry and a large force of artillery in Schumla itself ; 6 battalions and 2 batteries occupied the outer forts and a tent camp near them ; 2 battalions and 1 H. A. battery at Kasan, in the approach to the Balkans, and lastly 1 battalion each at Deshuma, Jenikoi and Eski-Stamboul. Great care has been taken to make the parapets and breastworks of a strength to resist modern artillery ; numerous traverses have been built, powder magazines thickly covered with earth, quantities of ammunition and provisions stored, and these can be replenished by the Varna-Rustchuk road. The weak point of Schumla is its right flank, which may easily be turned by Pravady, unless there is a corps of observation there ; the neighbourhood of Varna however would make such a diversion extremely precarious.

Varna is a place of great importance. It is situated at the estuary of Lake Devna into the Black Sea, and forms an excellent war harbour. The value of this fortress is enhanced when we consider how the maritime power of the Porte has increased of late years, and that it is especially from here that all kinds of war material can best be supplied to the army. Since July 1871 several new fortifications have been projected and commenced, for it was seen that on account of the greatly increased range of modern artillery the heights to the North commanded the fortress. There are two great batteries on the sea side ; on the land side there is an old enceinte with bastions, and strong works are in course of construction over against the above mentioned North side, and also to the South of the Devna lake.

In order to besiege Varna two large corps would be required : one N., the other S. of the town, which, separated by the Devna lake, would not be in a position to support each other. To shut out Varna from the sea would be at present out of the question, as the Turkish fleet is much the stronger in the Black sea ; doubtless also the fortress has been amply supplied with provisions and artillery material. To garrison Varna 15,000 men are necessary.

III.—THE DEFENSIVE LINES OF CONSTANTINOPLE, THE BOSPHORUS AND THE DARDANELLES.

Should the Russians get safe over the Danube and Balkans there remains yet another line to pass before reaching Constantinople, viz :—Bujuk Tchekmedsche to the Derkos lake. This line extends across the Thracian peninsular at about 28 miles from Constantinople ; although at present it is not adequately strengthened, yet it is by nature so well adapted for fortification works, that in a few weeks it might be made almost impregnable. The direct distance from the Southern most point of the Derkos lake to Bujuk Tchekmedsche is 13 miles. North of Bujuk Tchekmedsche the heights offer a most advantageous position for building a fort which would completely bar the road from Adrianople, to Constantinople, the only good approach. A second work at Tasunkoi and a third S. of Delijanus would, in connection with fort Karaburnee on the Black sea, effectually stop the way to Constantinople. In 1853 these positions were minutely inspected by Sir John Burgoyne, and again lately by the Turks with a view to building fortifications. From the small extent of the line but few troops would be necessary for its defence, and its neighbourhood to Constantinople insures to the defenders constant supplies ; there is also abundance of water, as the great reservoirs which supply Constantinople are there.

The town of Constantinople is in the shape of a triangle ; the base of which, towards the land, (about 6500 yards long) is enclosed by a wall, garnished with towers, at each end of which are the seraglio and the Citadel. Although this wall was built long before the introduction of modern artillery, yet, by erecting earth works, it might be improved into a tolerably strong defensive position. Towards the sea the defence of Constantinople depends on the Bosphorus and Dardanelles. The most important fortifications are in the Dardanelles, the motive which led to their improvement was a political one, and the work was carried out at the instance of England (1858). After long delay the Sultan (1863) yielding to the pressure of the English ambassador gave the necessary orders for restoring the old works and strengthening them with new batteries.

The Bosphorus.—The fortifications here have the object of barring the passage out of the Black Sea. The most important are :

(a.) Fort Kilios Burnu, on the North coast of the Thracian peninsular, $4\frac{1}{2}$ miles west of the straits ; the fort is on a height, which slopes down in three very steep shelves to the Black Sea ; the work is in the form of a regular quadrangle, with bastions flanking each other ; it is built of large blocks of free-stone, and the rampart stands 50—60 feet above the level of the Sea ; underneath are large galleries for storing provisions &c. The fort is armed with 66 guns.

(b.) *Fort Faranaki* stands on a steep isolated height immediately West of the Constantinople road, it is a quadrilateral with the angles blunted, and consists of an ordinary rampart with a stone parapet and embrasures for about 30 guns. From the land side the fort is commanded by the surrounding heights ; opposite, on the Asiatic side, is the battery Anadoli Fener, of but little military importance. The straits are here $1\frac{1}{2}$ mile broad. Some light-houses stand in front of the fort and battery.

(c.) Fort Kalesi, 2,000 yards South of fort Faranaki, is built on a mass of lava jutting out into the sea. The fortifications consist of casemented and open batteries in several stages (or stories), mounting 30 guns.

(d.) The battery Bujuk Limani 1,500 yards South of the latter fort is at the foot of a mountain spur which juts out into the channel; it has an ordinary earthen parapet, with embrasures for 10 guns, and is in a position to bring a very effective fire on the Bosphorus. Opposite this battery, on the Asiatic side stand the forts Fil Burnu, Tabiaissi and Poiras Kalesi ; at this point the Bosphorus is only 1,500 yards across.

(e.) Fort Rumeli Kavaghi, 2,000 yards South of Bujuk Limani, situated at the end of a small valley, on the right bank of a brook which separates the fort from the village of the same name. This fort is also quadrangular in form, and consists on the land side of an ordinary wall, having at its extremities four-sided towers, which command the valley. The front, towards the Bosphorus is formed of two walls, one overtopping the other, and joined to the towers by two side walls. Close to the water (the straits) there is a battery for 26 guns, the left of which rests on the brook, and its right on a small tongue of land forming a salient angle. On the other side of the brook is a small battery for 4 guns, and lastly a third battery for 15 guns South of the fort, and at the foot of a height which separates the fort from the battery. All these batteries are built of free-stone.

(f.) Fort Anadoli Kavak, on the Asiatic side, corresponds to the last described ; it is of similar construction, and well supported by coast batteries. The breadth of the channel here is only 1,000 yards.

(g.) Forts Rumeli and Anadoli Hissari, on the European and Asiatic banks, are 5 miles South of the above, and at the narrowest part of the Bosphorus, which at this point is not quite 1,000 yards across. The works are very irregular, and consist of towers, some circular, some semi-circular and some quadrilateral,

The command of the passage against a fleet coming out of the Black sea is defective, because nearly everywhere the defence is directed across the channel, instead of enfilading it.

For offensive action against, for instance, Russian Ships issuing from the Black sea, the fleet under Admiral Hobart Pacha cruises in the

Bosphorus. The fortifications of the Bosphorus on the land side are simply useless, they are all seen into from the neighbouring heights.

The Dardanelles. This passage is about double as long as the Bosphorus, and much more importance is attached to its fortification ; lately 3 strong batteries have been placed, in addition to 32 forts, batteries and towers already there. Besides 250 guns on old systems, 102 pieces of the most modern construction and heaviest calibre guard the passage. The entrance to the Dardanelles from the S. is barred, on the European side by the fort and castle Sedil Bahr, and on the Asiatic side by fort Kum Kaleh, the distance between the two being $2\frac{1}{2}$ miles. To the N. of these on the Asiatic coast, and 11 miles N. E. of the entrance stands fort Kepes Kalesi, in front of which is a lighthouse. In the narrowest part of the passage (1500 yards) are the fortifications Kilid Bahr and Tchanak Kalesi, about $3\frac{1}{4}$ miles N. of the last mentioned forts ; $2\frac{3}{4}$ miles further N. are the works Tekel, and Naghera Kalesi, opposite fort Bukali, and distant from it 2000 yards. Besides all these there are a number of smaller fortifications, lodged in the rocks like swallows' nests. In the construction of the new batteries, two of which are to be on the European, and one on the Asiatic coast, it has not been forgotten that they are to sweep the passage in length as well as in breadth ; but even then it remains a question whether these batteries would be able to bar the passage against a well manœuvred fleet of ironclads. An attack on the land side, assuming a safe landing to have been effected offers considerable chances of success ; yet it is doubtful whether in this war a Russian fleet could seriously menace the Dardanelles. At any rate for the offensive protection of the straits a Turkish squadron of 7 ironclads is at hand.

(b.) *Fort Faranaki* ^{at}
West of the Constanti-
blunted, and consists
embrasures for about
manded by the su-
the battery. And
straits are here
fort and batte-

(c.) F
mass of la-
mated ar-
guns.

fort
it
in
t

IX.

CATALOGUE OF WORKS ON CAVALRY.

The following list is issued in continuation of those already published in the Journals for September, and December, 1876. The dates of publication of many books, are unknown ; but most of them were printed between the years 1775-1825.

Logos tacticos, & technē tactikē, &c. Tactics of Arrian. This work which has been translated into Latin, and Italian, is the principal source from which our knowledge of Roman Cavalry Tactics is derived. The loss of the portion treating on the manœuvres of Scipio's Cavalry is to be regretted. Arrian flourished about A. D. 148.

Epitedroma, A work written by the Emperor Adrian, treating of the combat of infantry against Cavalry. It was composed by the successor of Trajan in order to enable the Roman infantry to resist the Barbarian Cavalry. A. D. 120.

Tactica, &c. de instmendis aciebus. On the training of armies, or Tactics of Aelian. This work first written in Greek, has been translated into many languages. Into English by Bingham, and Lord Dillon. It gives an account of Macedonian tactics. A. D. 70.

Xenophontis libellus de re equestris. Latin translation. Original Greek by Xenophon. Has been rendered into English by the Revd. J. Watson, London 1869. Likewise, Hipparchicus, or a Treatise on the Duties of a Commander of Cavalry. A most excellent work, worthy of perusal. Couvier states "It is a lesson to all time."

A military catechism for the use of young Officers, and Non-Commissioned Officers of Cavalry, by J. C. Dalbiao, London 1806.

Reflections of Marshal Saxe ; and the regulations of the Prussian Cavalry, and Infantry ; translated by Fawcett, London. 1757.

Manceuvres for the review of Cavalry, with explanation for the use of young Officers, by Hackett, London.

Military observations, by Hally, with plates. London.

Instructions for Yeomanry Cavalry. 2 Vols. by Henies. London.

Discipline of Light Cavalry, by R. Hinde, London, 1778.

Lessons in Cavalry Tactics, Translated from the German of Bismark ; by Major Johnston London 1827. General Bismark wrote many other valuable works on Cavalry during the period 1818-1829.

Horse Artillery Manceuvres. Translation of a French work,

IX.

CATALOGUE OF WORKS ON CAVALRY.

The following list is issued in continuation of those already published in the Journals for September, and December, 1876. The dates of publication of many books, are unknown ; but most of them were printed between the years 1775-1825.

Logos tacticos, ἡ τεχνὴ ταctikē, &c. Tactics of Arrian. This work which has been translated into Latin, and Italian, is the principal source from which our knowledge of Roman Cavalry Tactics is derived. The loss of the portion treating on the manœuvres of Scipio's Cavalry is to be regretted. Arrian flourished about A. D. 148.

Epitedroma, A work written by the Emperor Adrian, treating of the combat of infantry against Cavalry. It was composed by the successor of Trajan in order to enable the Roman infantry to resist the Barbarian Cavalry. A. D. 120.

Tactica, &c. de instmendis aciebus. On the training of armies, or Tactics of Aelian. This work first written in Greek, has been translated into many languages. Into English by Bingham, and Lord Dillon. It gives an account of Macedonian tactics. A. D. 70.

Xenophontis libellus de re equestri. Latin translation. Original Greek by Xenophon. Has been rendered into English by the Revd. J. Watson, London 1869. Likewise, *Hipparchicus, or a Treatise on the Duties of a Commander of Cavalry.* A most excellent work, worthy of perusal. Couvier states "It is a lesson to all time."

A military catechism for the use of young Officers, and Non-Commissioned Officers of Cavalry, by J. C. Dalbiao, London 1806.

Reflections of Marshal Saxe ; and the regulations of the Prussian Cavalry, and Infantry ; translated by Fawcett, London. 1757.

Manœuvres for the review of Cavalry, with explanation for the use of young Officers, by Hackett, London.

Military observations, by Hally, with plates. London.

Instructions for Yeomanry Cavalry. 2 Vols. by Henies. London.

Discipline of Light Cavalry, by R. Hinde, London, 1778.

Lessons in Cavalry Tactics, Translated from the German of Bismarck ; by Major Johnston London 1827. General Bismarck wrote many other valuable works on Cavalry during the period 1818-1829.

Horse Artillery Manœuvres. Translation of a French work,

"Manceuvres d'artillerie à cheval," written by the celebrated Polish General, Kosciusko, who died in 1817. One of the earliest works on the subject.

Lessons in Cavalry Tactics, Translated from the German of Bismarck ; by Major Ludlow Beamish, London 1827.

Speedy manner of forming squares to resist cavalry, translation from the French ; by Macdonald, London, 1801.

Uniforms of the British Army, by C. Marchard, London 1819.

Treatise on the discipline of Light Cavalry, by Neville. London, 1791.

Instructions for the education of Cavalry, by Pembroke. London, 1768.

Translation of the Instructions for Hussars, and Light Cavalry, acting on service ; by Rose, London.

Progressive Instructions for men and horses; also Rudiments of the service of Cavalry, by Skene, London.

System of manœuvres for Cavalry of the Line, by Wittingham. London.

Remarks upon the Raising, Armament, and Uniform of British. Cavalry, and Infantry ; by Dalrymple, London 1761-1767, also "Tactics" by the same author, 2 vols. 1780.

The wild sports of India ; with remarks on Horses, and the Formation of Light Irregular Cavalry, by Major H Shakespear, London 1862.

Historical Record of the 18th Hussars ; by Captain Malet, London 1874.

Military equitation, or a method of breaking horses &c. ; by the, Earl of Pembroke, London 1778.

History and Art of Horsemanship ; by Berenger, London 1771.

Academy for Grown Horsemen ; by Gambado, London 1788.

System of equestrian education ; by Astley London.

Annals of Horsemanship ; by Gambado, London, 1791.

The Book of the Horse ; by Sidney, London 1875. The latest and most complete work on the subject, Fully illustrated.

Notes on Shoeing Horses ; by Colonel Fitzwygram London.

Hints on Horsemanship ; Colonel Greenwood, London.

Horsemanship ; or the Art of Riding, with instructions for breaking in Colts ; by Captain Richardson, London.

Remarks on Drill, with Rough Sketches of Field Days ; by Major General Sir S. Cotton, Calcutta, 1857.

Non-Commissioned Officer's Handy Book for Cavalry and Engineers, Calcutta, 1873.

Studies and Lectures compiled during the great Strategical Manœuvres of the Russian Cavalry on the Vistula in the Autumn of 1876. By G. Von Widdern, Gera, 1877. This work is divided into two parts, The first refers to the Manœuvres executed ; based upon the account of the Russian Invalides. The second recommends the execution of similar manœuvres by the Prussian Cavalry.

Horsemanship ; by Herbert. 2 Vols., New York, 1871.

Method of Horsemanship ; by Boucher, New York, 1856. Translation from the French.

Technological Military Dictionary in French, German and English ; by Duckett. London 1870.

The Veterinary Journal, October 1876. London. This number contains an article on "The Diet and exercise of Regimental Horses in India," by "Max" ; well worthy of perusal.

The Veterinarian. June 1876, London ; has the following, "Hippopathology in India, by Major R. Cane, Royal Artillery.

The History of Cavalry, by Lieutenant Colonel George Dension. London, 1877. The most recent work on the subject ; being one of the prize essays written for the Russian Government. The same author has also published "A Manual of Outpost Duties." Macmillan & Co. Publishers.

The Veterinary Journal. November 1876. Equine Paralysis (Kumree) in Burmah and India, by R. Poyser. Also an article on "Bursautee" by Max. January 1876. "The Veterinary Organization of an Army Corps on a War establishment."

The Secrets of the Sword, by Captain Burton the famous traveller. A work on fencing, swordsmanship, &c. This author also designed a Book on Cavalry, but I am not aware whether it was ever published. For reference vide "The Inner Life of Syria, Palestine, and the Holy Land," by Isabel Burton, London 1875. Vol II. page 147.

Tenth Royal Hussars, Rules for Skirmishing, Agra Central Prison Press, 1876.

Standing Orders of the 19th Hussars Canterbury, 1870.

Instructions for Cavalry Outposts. Provisionally approved for Autumn Manœuvres 1872. London.

What to observe, and How to report it, by Major L. A. Hale, R. E.
being Instructions in Reconnaissance for Non-Commissioned Officers of
Cavalry. Chatham. 1873.

Animadversions on War. with notes on the drilling of Horse Troops,
by Ward published about 1650, the earliest English work on the sub-
ject. B. Quaritch. London, recently had a copy of this book for sale.

Reigles Militaires du Chevalier Melzo touchant la Cavallerie,
Antwerp, 1615. A very complete essay on the organization, discipline,
and instruction of Cavalry at that period, illustrated with curious
plates.

Instructions and Regulations for the formations and movements of
the Cavalry, London, 1801.

Field Exercises and Evolutions of the Army, by Torrens. London,
1824.

History of the King's German Legion. 2 Vols. by Beamish.
London 1832-37. Coloured plates of uniform, maps, &c.

The complete body of Art Military, by R. Elton, diagrams, 1650.

System of Equestrian Education, by Astley, plates, 1801.

Complete horse-man and expert Trainer, by. T. DeGrey, 1670.

General System of Horsemanship, by the Duke of Newcastle. 2
Vols. 1743.

Winterus de Re Equaria, Method of breeding horses, producing
Cross-breeds, Mules and Mongrels. Nürnberg 1687.

Histoire Militaire des Elephants, par Armandi, Paris 1843.

De Militia Equestris antiqua et nova, libri V. plates and engravings,
illustrating different modes of placing cavalry in battle-Antwerp. 1630.

Esprit de Loix de la Tactique et de differentes Institutions
Militaires, par Comte de Saxe 2 Vols. Franckfort, 1762.

Art militaire à cheval, instruction des principes et fondements de
la Cavallerie, Zutphen, 1621. By J. Wallhausen.

G. H. ELLIOTT, LIEUT.,

3rd Bengal Cavalry.

N O T I C E .

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1878.

Members can pay their subscription to the Alliance Bank, Simla if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton as they desire.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV, V and VI to any member wishing for the same.

H. H. STANSFIELD, LIEUT.-COLONEL,
Secretary.

ORIGINAL PAPERS.

I.

NOTES ON THE HISTORY, MATERIEL ORGANIZATION AND TACTICS OF ARTILLERY.

BY

CAPTAIN E. H. H. COLLEN.

*Assistant Secretary Government of India Military Department.
(Continued from No. 28.)*

So far then we have sketched the organisation and administrative system of the British Artillery, and it now remains for us to make a few remarks on the proportion of guns to men in armies, and to describe the arrangement and combination which would be made in the event of a British force taking the field.

In treating of the system of organisation and administration in regard to the artillery which England possesses, we have only spoken of the normal arrangements and combinations. Unfortunately as our Army is not distributed or organised according to the higher tactical units, we possess no combinations of artillery with the other arms on any well defined plan. These matters with us, are not regarded of the highest moment, and we are content to leave the time of emergency to develop the necessary organisation. It would be unfair, on the other hand, to suppose that there are not difficulties of a grave, and in some cases, of an insurmountable nature, standing in the way of any British organisation which shall fulfil both the conditions of peace and war. Our Colonial possessions, and the vast extent of our Indian empire have necessitated the distribution of that portion of our Artillery on foreign service, on principles other than those which obtain in the more facile systems of continental armies. In the United Kingdom we may trust that the distribution and combination of our forces on true tactical and administrative principles is only a matter of time, and it is perhaps a subject for discussion whether in India this cannot also be effected, although a rigid uniformity is inapplicable to the varying conditions of that empire.

The proportion which the number of guns should bear to the number of troops, has varied with the circumstances of the age and country, and the estimation of the power of the Artillery arm. During the wars of the 18th century the proportion was usually 3 guns per 1000 men, but in the earlier wars of the French republic the allies

appear to have increased the proportion unduly, and it followed that Napoleon practically reduced the amount of Artillery. He advocated 2 guns per 1000 with old and tried troops, but with the usual composition of an army 3 guns per 1000. In his actual campaigns the proportion fell as low as 1-8 per 1000. Throughout the wars of the earlier part of the 19th century 3 guns per 1000 was generally recognised as the proper proportion, but in the Crimea and in 1859 the Russians and Austrians increased this rate considerably. The great increase to the strength of armies which took place in 1866 and 1870-71 resulted in the diminution of the proportion. The Germans having less than 3 per 1000 although the French with a smaller army had still 3 guns per 1000. It may be taken as a general principle that for very large armies, 3 guns per 1000 men will be a maximum. In smaller armies, or in large armies acting in an unenclosed level country a higher proportion will perhaps be employed in the future, while in difficult and mountainous countries this ratio will be decreased. The reader is referred for a fuller consideration of this subject to a paper by Captain Baring R. A. in No. 1 Vol. VIII. Proceedings R. A. Institution.

The proportion of guns to men in the military forces of the empire may be calculated as follows :—

The number of field, mountain, heavy field or position guns including dépôt batteries and a few batteries of native Artillery in India *i. e.* the grand total for field service is 784. The total strength of the Imperial army of British and Native troops exclusive of reserves &c. is about 320,000. This gives only 2-45 guns per 1000 men. In India the proportion is somewhat less or only 2-09 per 1000.

In India a large proportion should be maintained, both on account of our weakness in infantry, the nature of the country and the effect of a preponderance of artillery upon native troops.

The tactical distribution of artillery in regard to the other arms will be found under 'Army,' and it is sufficient to mention here that in the proposed organisation of a British Army Corps, 2 field batteries are allotted to each Division, and 1 battery of horse artillery to the Cavalry brigade, the 'Reserve' or 'Corps' artillery being composed of 3 batteries of horse artillery, and 3 field batteries, making a total of 13 batteries or 78 guns.

The questions which we may expect to see solved one way or the other in the ensuing years, in regard to artillery organisation are the division of the huge regiment of artillery into comparatively small units, the separation of the field from the garrison Artillery, and the eventual transformation of the brigade system into some arrangement which shall fulfil the conditions of peace and war more completely than the present one is said to do. Little more can be done in this essay than an indication of the arguments for and against the changes which

seem to be on the horizon. In regard to the breaking up of the huge list of officers which now furnishes the horse, field and garrison, few can doubt that it would in some respects be a difficult and distasteful task. Those who read the histories of the old Royal and Indian artilleries now amalgamated into one gigantic "Regiment" cannot fail to perceive how grievous must be the disruption of regimental ties which have been forged by the brilliant deeds and the dignified history of the past, and those are not wanting who declare that such a step would be downward in regard to that efficiency for which the artillery of England is celebrated. On the other hand, many question the existence of a true regimental bond between those various bodies of which the Royal Artillery is composed, or that it can in the future exist when the present differences may indeed have disappeared, but when the men are separated and the officers even in the course of a long service may never meet in regimental intercourse the greater portion of their comrades. Again, it is asserted that the promotion of officers going by seniority in one long list is a difficult and expensive arrangement and that periodical stagnation only relieved by abnormal efforts is scarcely a good system for the efficiency of the officers or for the country. The distance of our Indian and Colonial possessions causes the transport of officers and men to be a costly item in army expenditure, while the non connection of the promotion of the officers with the body of men to which they are attached, operates most unfairly to individuals whose steps of promotion may perhaps fall in such a way that their life time may be passed on foreign service. Nor is to be left out of consideration that the shifting of officers from one brigade to another in promotion is scarcely a good thing for the men. It seems to be agreed however that if a separation is to take place it must be for reasons beyond those which dictate the division of the field and garrison Artillery. The separation of the field and garrison Artillery may be regarded as complete in respect to the men, and very many will be found who advocate the same principle being applied to the officers. It is said that the duties are distinct and require men of different characteristics, that the tendency of the present day is to officer the Horse and Field Artillery at the expense of the garrison service, and that the materiel of the latter is now so complicated as to render it the study of years, and that any benefit from the infusion of new blood from the field Artillery is nullified by the impossibility of an officer mastering to the highest point of efficiency all the varieties of Artillery knowledge. The field artillery complain that officers are promoted into that branch who are quite unfit for it, and that men may rise to high positions of command who have only served in one branch of the regiment. But the opponents of any change state that they consider the system supplies a valuable training, and gives a man of ordinary ability opportunities of a varied nature to learn the many branches of Artillery service. The question seems to be whether in view to the now distinct separation of men and materiel, the division is not desirable, taking into consideration the actual practical result of

the present system. It cannot be ignored that the personnel even in regard to officers is practically divided *i. e.* an officer usually takes one branch of the service as his line, so that up to a certain point we generally find men are essentially field or essentially garrison artillery officers, beyond that point and in higher commands the individual may exercise authority over all branches although he may have only served in one of them. The advocates of separation maintain that by the early training at one institution the Royal Military Academy, and by the fact that all belonged to the artillery as a corps and branch of service, as much *esprit* would be maintained as is at present the case, and that if officers were appointed provisionally to either branch, and exchanges allowed, sufficient room would be provided for the transference of officers who may find themselves in their wrong place. The abolition of the present Brigade system has been more than once urged. Many experienced artillery officers consider that it causes great delay in conducting correspondence, and in the difference of authority between brigade and district commanders. They say that a brigade of garrison artillery may be scattered half over the world, that under such circumstances, the promotion of Non-Commissioned officers, the transmission of returns, &c. becomes a tedious process, and that no real control is exercised by the Brigade commander over batteries widely separated, in different artillery districts. Again, it is alleged that there is an evil of a serious nature in relieving such a large body as a brigade at one time from an important fortress as Malta or Gibraltar; while it is stated that as in most instances the duties of the brigade staff are local or territorial and should be really so, and that while the brigade is a good administrative unit when the batteries are stationed close to each other or in the same district, the advantages cease when the fractions are scattered. It is further urged that the brigade is two large for the tactical unit and that this should as far as possible correspond with the administrative unit. On the other hand those who consider the brigade system an improvement state that it has worked well, especially in the matter of promotion of non-commissioned officers through the batteries of a brigade. It seems sufficient to quote the evidence of General Sir Collingwood Dickson V. C., C. B. to the effect that "until some better system can be introduced it would be a pity to disturb the present one." Whether the problem does not admit of another solution is by no means certain, although the difficulties would be of a grave kind, and could only be overcome by a comprehensive remodelling of the whole system of artillery organization. If the British and Indian armies were divided and organized on the army corps system, the way would be pointed out and made more smooth. The field artillery (including horse) could be organized in regiments of such magnitude as would suit the numbers of the army corps. The garrison artillery would be similarly organized as a distinct branch and under the territorial system it might be possible in both branches to lean upon the artillery militia for a reserve of gunners in case of any national emergency arising. Nor can it be denied that

it would be a more satisfactory system which in peace time maintained a small strength capable of expansion at need, so long as it could be shown that we knew how the reserves of men and horses would be forthcoming. The colonial stations must ever remain a bar to a perfect organization, and for these it would be necessary to have a certain number of garrison artillery regiments over and above those stationed with the territorial army corps in the United Kingdom and India. A regiment of garrison artillery on foreign service would be scattered just as a brigade is now, but the commands might be local, and there would be the advantage of officers being promoted from one station to the other on foreign service, and going home with the regiment and sharing its fortunes.

The organisation of the French Artillery has been completely changed by recent regulations. Previous to the Franco-German war of 1870-71 it consisted of horse artillery and 1 field Artillery regiment of the Guard, 4 horse artillery and 12 field Artillery regiments of the line, with Garrison Artillery making up 19 regiments. The horse Artillery regiments consisted of 8 batteries of 6 guns each and the field Artillery regiments of 12 batteries. Only 8 out of the 12 were mobilised during war, 4 remaining as batteries de sortie for Garrison service. The number of field guns available was 984. This number of guns could not be put in the field at once, as 58,000 men, and 39,000 horses were required, while in peace time only 34,000 men and 16,000 horses were kept up. The guns in the service were a 9 pounder (shell) mountain gun of 2 cwt. 9 pounder of 6½ cwt. for field Artillery (canon de 4) 16 pounder of 11½ cwt. (canon de 8) 25 pounder of 12 cwt. for position Artillery (Canon de 12) and 50 pounder of 40 cwt. (canon de 24) for siege purposes. These were of bronze and rifled in the La Hitte system. In naval service B. L. R. guns of cast iron, strengthened by rings, have been employed ranging from 70 to 300 pounds. The field guns fired studded projectiles shell, shrapnel, and case; and the heavy guns heavy elongated projectiles of similar kinds.

In accordance with recent regulations each of the 18 French Army Corps has a brigade of Artillery attached to it, consisting of two regiments, 1 of divisional the other of Corps Artillery. The divisional regiment consists of 8 field batteries and 1 dépôt battery, the Corps regiment of 3 horse Artillery batteries, 1 of which is attached to the Cavalry in time of war, 9 field batteries, 1 of which is utilised for service in Algeria, and 1 dépôt battery. Each brigade has besides 4 dismounted batteries for Garrison service, and 4 companies of drivers for ammunition columns. An Army Corps has therefore, 4 batteries attached to each of its divisions, and employs 10 batteries in addition as its corps, or as it was formerly called, reserve Artillery. The war strength of each battery is 5 officers and 168 men. The field guns in use are the 15, and 10 pounder bronze B. L. R. Rettze guns.

The military forces of Germany are distributed territorially in

time of peace in 18 Army-Corps (including the guard Corps and that of Alsace-Lorraine).

Peace establishment. To each Army-Corps is attached a *Brigade* of Artillery combining a regiment of Field Artillery and a regiment or portion of a regiment of Garrison Artillery. The Field Artillery regiments consist each of a staff, 15 batteries, and 10 ammunition columns, the Garrison Artillery having a strength of 8 Companies. The Artillery brigade is commanded by a General Officer or a Colonel, who is allowed an '*Adjutant*' or Aide-de-Camp, who fulfils the duties of both these staff officers of our service.

Promotion goes by the brigade, and an interchange of officers between Garrison and field Artillery takes place. In addition to the General Command of the Artillery by the officer Commanding the army corps, there is an Inspector-General placed at the head of the whole, the Artillery being divided into a certain number of 'inspections,' or districts for inspection, each being Commanded by a General Officer.

Under the Inspector General of Artillery are placed :—

1. Select Committee of Artillery officers, which discusses questions connected with regulations and organization.
2. Committee for experiments,
3. Committee for the examination of lieutenants for promotion to Captaincy.
4. Laboratory School.
5. School of Gunnery at Berlin.
6. The manufactories and the arsenals.

War organisation. On the Army-Corps being placed on a war footing, the Garrison Artillery regiment is increased according to circumstances, and forms part of the garrison troops. The field Artillery regiment is expanded as follows :—

Regimental Staff,	
3	Divisions of Field Artillery
1	Division of Horse "
1	" of ammunition columns
1	" of the dépôt.

A division of field Artillery comprises 2 Batteries of 9. c. guns (Schwere Fussbatterien) and 2 batteries of 8c. guns (leichtle Fussbatterien) the horse Artillery division consists of 3 batteries of 8c. guns (reitende Batterien); the division of ammunition columns comprises 10 columns, 6 of which are intended for the transport of artillery ammunition, and 4 for small arm ammunition. The dépôt division consists of

1 horse battery of 8c. guns 1 field battery of 8c. guns, 1 field battery of 9c. guns, and 1 section of artificers. Each battery has 16 carriages viz:-

6	Guns,	each	with	6	horses
6	Wagons	"	"	"	"
1	Provision wagon	"	"	"	"
2				4	horses
1	Forge	"	"	6	"

and carries the following ammunition.

		Ammunition.								Total per battery.	Remarks.
Battery of 8c. guns (6 pr.)	Batteries.		Gun limber.	Wagon limber.		Wagon body.	Total per gun.				
		Common shell	... ... 36	36	32	104	624				
		Shrapnel	... ... 8 49	8 52	24 56	40	157	240	942		
		Case	... ... *5	8	,,	13	78				
Battery of 3.5" guns (4 pr.)		Common shell	... ... 24	24	42	90	540				
		Shrapnel	... ... 6 34	6 36	21 63	33	133	198	798		
		Case	... ... 4*	6	,,	10	60				

* Includes the round in the
trail pocket

The ammunition columns have 24 carriages for the Artillery ammunition column and 27 for the small arm ammunition column.

These columns provide a first reserve of about 100 rounds per gun.

Such was the organisation of the German Artillery prior to the 1st November 1872. The Field Artillery of each army corps will now number two regiments instead of one. The first regiment, or corps-artillery will comprise 2 divisions, having each 3 batteries of 6 prs. and 1 Horse Artillery division of 3 4 pr. batteries; or 9 batteries. altogether; the second regiment or divisional artillery regiment consists of 2 divisions, each having 2 6 pr. batteries and 2 4 p r. batteries; or a total of 8 batteries.

The Field Artillery regiments have been re-numbered, and there will be 32 of these in addition to 4 regiments of Bavarian Artillery. Under the new organisation the German Field Artillery will consist of 296 batteries i.e., 250 field and 46 horse or 1776 guns. In addition

there would be the dépôt and reserve batteries raising the total to 2,424 guns.

The following is the disposition of the personnel and horses, on the war establishment.

Under the new organisation the Field Artillery will depend on the Artillery-Inspection for all that relates to *personnel* and *Materiel*, the military command remaining the same. The garrison artillery is separated from the field artillery, attached to army territorial commands, the officers can only be transferred from one branch to the other, with the consent of the head of the Empire, or the War minister. The connection between the Garrison Artillery and the 'Artillery inspections' has also been severed.

The Foot or Garrison Artillery has also been re-organised into 30 battalions counting 122 batteries or companies. The number of regiments is 19, but the number of battalions in each regiment varies. Under the new organisation 600 batteries of field and Garrison Artillery could be placed in the field.

The usual composition of a siege-train is 320 guns.

200 rifled guns	{	40 of 9 c. (6 prs.)
		100 of 12 c. (")
		60 of 15 c. (long)
32 rifled short		15 c. guns
48 heavy mortars, R and S. B.		
40 light "		"

This number has however been increased to 400, and two or three of such trains are to be kept up, containing heavy guns of large size and weight, superseding anything up to the present time employed in sieges.

The following scale of projectiles is provided :—

1000 Common shell	{	per
		rifled
100 Shrapnel	{	gun.
500 to 600 shell per howitzer or mortar,		
100 hardened Cast iron projectiles per rifled long 15 c. gun.		
25 case per 9 c. rifled gun.		

AUSTRIA.

The Austrian Artillery is divided into *Field* *Garrison* and *technical* Artillery.

The *Field Artillery* consists of 13 regiments, each of which on a peace establishment comprise :—

STAFF.

4	...	4 pr. field batteries
3	...	4 pr. horse Artillery
5	...	8 pr. field batteries

Cadre of a dépôt battery.

5 or 6 cadres of ammunition columns.

By the re-organisation in 1873 the dépôt battery has been made an effective one by its being raised to a strength of 4 officers, 114 men and 46 horses.

These 13 regiments have each permanent head quarters in Prague, Olmutz, Komorn, Josephstadt, Pesth, Gratz, Vienna, Pesth, Lemberg, Neustadt, Vienna, Laibach, Tenesvar. The regimental staff is thus composed.

			Peace Estab- lishment	War Do.
Colonel Commanding	...	...	1	1
Lieutenant Colonel Commanding Reserve Artillery of Army Corps	...	...	1	1
Major, Commanding divisional Artillery or Subdivi- sions of Artillery reserve	...	...	2	3
Captain, Commanding reserve ammunition	...	...	...	1
Subalterns, acting as <i>Adjutants</i> (A. D. C's.)	...	...	...	5
Trumpeter	...	...	1	1
Non- Combatants	Surgeons Paymasters Vety. Surgeons Artificers, clerks &c., and N. C. O's. 1 Collarmaker, 1 Smith 1 Wheeler Hospital orderlies Drivers Servants	...	4 2 1 3 3	5 2 2 6 3
Horses	Officers N. C. " draught "	10 10 10 5	...	4 16 24

In peace time, each battery has only 4 guns horsed, and 2 ammu-
nition wagons. When placed on a war-footing, the batteries from 1 to

12 are completed ; and with the dépôt cadres 2 8 pr. batteries are formed, and numbered 13, 14 ; also a dépôt battery, and the ammunition Columns. An Army-Corps composed of 3 infantry divisions has 4 4 pr. field batteries, 6 8 pr. and 2 horse artillery batteries, and 4 ammunition columns. 3 ammunition columns accompany the divisional artillery, and the 4th column the artillery park of the army-corps, accompanying which is a detachment of arsenal artificers to execute repairs. In an army composed of several army-corps, the Nos. 5 and 6 ammunition columns form part of the general park.

Batteries on a war-footing are composed of 8 guns and 8 wagons each drawn by 4 horses for the 4 pr. field batteries, and by 6 horses for the other batteries ; the additional carriages number 5 in the 4 pr. field batteries, and 6 in the others.

The 4 pounder batteries carry 156 rounds of ammunition per gun, the 8 pounder 128 rounds. The 1st ammunition reserve conveys in addition 47 rounds for each 4, and 82 for each 8 pounder. The total, number of rounds for each gun is therefore 230, and 210 respectively.

In order to avoid dependence on foreign contractors attempts are being made to cast a hard bronze for field guns, and it is hoped that by employing this metal a portion of the new equipment may be furnished by the Austrian Arsenals.

The war materiel necessary to place the batteries on a war footing is kept under charge of the field Artillery, stone houses being apportioned for it in the barracks of each regiment. By this system mobilisation is more quickly effected and the material is better looked after than when stored in Arsenals. Including the dépôt batteries the Austrian Artillery numbers 209 batteries or 1627 horsed guns.

The system has not long been changed as to the custody of munitions of war, which have now been handed over to the troops. It is urged 1st that arsenal officials are usually occupied by other duties ; 2nd that the artillery officers in charge have a direct interest in maintaining all the equipments in a thoroughly efficient condition, being dependent on this condition in war, while the officials of the arsenals have a kind of interest in getting rid of objectionable stores to the troops ; 3rd the mobilisation is effected far more rapidly under the new system.

Including the dépôt batteries the Austrian artillery numbers 195 or 1560 horsed guns, and taking the effective war establishment of the Austrian army at 700,000 this only gives a proportion of 2·1 a 2·2 guns per 1000. This does not include mitrailleuses and it must be remembered that the 8 prs. are much more numerous than the lighter guns.

Garrison Artillery. This is composed of 12 battalions and 1 coast artillery regiment, the latter consisting of 3 battalions of 4 companies

each, increased in time of war, and also furnishing 4 mountain batteries. The 12 Garrison battalions have each 5 Companies in peace time, and furnish 5 mountain batteries. In war-time the number of Companies in each battalion is increased to 6, and the mountain batteries to 6 also.

The mountain battery has 4 guns and carries 112 rounds per gun i.e. 72 common shell, 14 shrapnel, 16 case. The Garrison battalions have charge of the mountain equipment, while the materiel for the fortresses is under the administration of the arsenals.

Technical Artillery. This division comprises the workmen charged with the construction, and repair of guns, small arms, ammunition, artillery material, harness &c.

The personnel is distributed in 16 arsenals, and the chief artillery command established in the chief cities and towns of the empire. Vienna, Gratz, Karlstadt, Prague, Olmutz, Cracovia, Komorn, Karlsbourg, Stein, Trieste Zorn, Inspruch, Ragusa. In war-time Companies of artificers are detached to the parks of each army corps. Artillery officers have to serve by roster in the Technical artillery, the effective of which is about 3000 men and comprises 29 Superior officers, 55 Captains, 170 Lieutenants.

Instruction. In each battalion or regiment a School exists for the instruction of Non-Commissioned officers, one year volunteers, and artillery cadets. This school is dissolved on mobilisation taking place. The instruction of officers is conducted at the cadet school, and at the *Academy of Technical Artillery* (formerly the Artillery and Engineer Academy.) These institutions are not broken up in War time. On leaving the academy officers ordinarily pass into the Garrison Artillery, and after a year in this enter one of the regiments of artillery. After a second year they may be admitted on application to the advanced course of artillery, and after passing successful examinations are nominated as first-lieutenants.

In each regiment there is an autumn course of equitation, and a varying number of officers, and non-Commissioned officers are drilled in riding and in stable duties, in order that they may be fitted to act as instructors in batteries. Those who are the most proficient are selected to go to the Central School of Equitation at Vienna, and from thence are appointed as Riding-Masters or instructors to the artillery regiments. There is also a Laboratory School at Vienna.*

The organisation of the Russian army is divided into : Regulars, Irregulars, Imperial Militia. The regular army is again divided into 1. Field or active army, 2. Local or garrison troops. The Division is

* The author is indebted to the *Revue d'artillerie* for much information regarding the continental artilleries.

in peace-time the tactical and administrative unit. The artillery of the active army consists of 50 Brigades of Field and 8 Brigades of Horse artillery, besides Siege Trains, Parks, and Mobile arsenals. The Field Artillery comprises 48 batteries rifled 9 prs. 105 batteries rifled 4 prs. mountain batteries, 50 mitrailleuse, and 18 horse artillery, 4 pr. batteries. The total force in the time of war 1400 B. L. guns and 400 mitrailleuses. A Brigade of Artillery consists of 3 batteries and, mitrailleuse battery and these brigades both in peace and war belong to the Infantry divisions and have corresponding numbers.

There are four descriptions of batteries :—

- | | |
|----|---------------------------|
| 1. | ... 9 pr. field batteries |
| 2. | ... 4 pr. field and horse |
| 3. | ... 3 pr. mountain „ |
| 4. | ... mitrailleuse „ |

1, 2, 4 have 2 wheeled ammunition carts. Each battery has 8 guns, and each gun has 4 or 6 horses in its team according to the weight of the piece. No. 1, carries 120 rounds No. 2, 130 rounds, and No. 3, 98 rounds, per gun. The mitrailleuse having 6290 rounds.

In the 9 pr. battery there are 24 and in the 4 pr. 16, carriages.

The field batteries have three distinct establishments : 1 war, 2 increased peace establishment, 3 peace establishment. A 9 pr. battery on the first establishment has 6 officers, 316 non-commissioned officers and men and 214 horses. On the second establishment, 6 officers 252 non-commissioned officers and men and 102 horses, on the third establishment, 6 officers, 217 non-commissioned officers and men and 56 horses, and the other batteries in proportion.

The local troops comprise (a) reserve batteries (b) garrison artillery and local artillery detachments (c) instruction field and horse batteries. The (a) reserve batteries number 16 and are for the purpose of training men and horses required for field artillery, (b) the garrison artillery is intended for fortress defence and for laboratory work. The peace establishment is 59, and the war do. 91. (c) There are also local artillery detachments which take care of artillery matériel when stored in open towns, and these take the name of the place at which they are stationed.

There remain to be noticed the Irregular Artillery of the Cossacks, which comprises 27 batteries.

The great increase and development of the Russian army commenced in 1873 has been attended with increase to the artillery. Each artillery brigade is to consist of 3, 9 pr. batteries, 2, 4 pr. batteries and 1 mitrailleuses, making 48 pieces. The grand total is 300 batteries with 2400 guns. The law regarding conscription published in 1873 must

have the effect of vastly increasing the military strength of the Empire, and provided money and officers be found, Russia will be able in the future to send a army of 500,000 across her frontiers attended by a powerful artillery, while still retaining an armed host for the defence of the country.

D. TACTICAL.

This fourth section of our essay will treat of drills and uncombined tactics. The subject of tactics of artillery combined with the other arms is dealt with in another place. A large portion of artillery drill being used in garrison and siege service can scarcely be classed with that field part of it, which may be called a preparation for tactics. Drill itself is not tactics, but only the elementary training and education required for the higher development. After enumerating the various drills used in the artillery service, we shall conclude this essay with a brief account of the use of artillery in particular battles.

We shall follow the same order as in Section C. dividing the subject into Field, Siege, Garrison. Field drills would be divided into *a*. drill for mountain artillery *b*. horse artillery drill ; *c*. field artillery drill.

a. Mountain Artillery Drill for mountain batteries is not laid down in any book of regulations, so far as the writer is aware. It is however conducted on the same general principles which guide the drill of a field battery. The battery may consist of 4 or 6 sub-divisions, each subdivision comprising mules carrying gun, carriage, wheels and ammunition boxes. Many plans have been tried for regular movements, but a mountain battery should be drilled so as to advance for action with as much evenness as possible. With mountain rifled guns a great object is to secure the best possible positions quickly and not to disperse the guns too widely. The movements of a mountain battery in "column of route" i. e., single file, in "columns of sub-divisions" the ammunition mules being along side the gun and carriage mules, or in "columns of divisions," sub-divisions being side by side, two and two, are merely adaptations of the manœuvres of a field battery.

The gun drill too is only an adaptation of field gun drill.

The drills and instruction for horse Artillery are as follows : (1) Equitation or riding drill. (2) Foot drills as for Cavalry. (3) Sword drill (4) Field gun drills. This includes the actual service of the guns, the loading, laying and firing &c., position of gunners and detachments under various conditions, limbering up, unlimbering, exercise with drag ropes &c., also such exercises as dismounting guns and carriage, mounting gun and carriage, replacing a damaged wheel, exchanging gun and limber wheels, shifting shafts from double to single draught and vice versa, moving disabled ordnance &c.. For details the reader is referred to the manual of Artillery exercise (5) Battery exercise (sometimes called by

the horse Artillery "gun drill)." In the horse Artillery each sub-division consists of gun and waggons with 2 non-commissioned officers and 6 or 8 gunners besides drivers. The gunners are carried on the limbers. The rest are mounted and are called the detachment, which is placed in front rear, or on a flank of the gun, according to circumstances. Ammunition waggons of horse Artillery do not manoeuvre usually, but merely conform to the movements of the guns at a safe distance. A battery of 6 guns occupies 95 yards, each gun being 19 yards from the next. When a battery comes into action, each detachment dismounts, the limber gunners get off the gun limber to the rear, the trail is unyoked, the limbers drive on and the gun is placed in position and the Nos. 1 lay them during the loading. They are then fired independently, unless the Commanding officer gives orders to the contrary. "Limbering up" is the converse operation. The details of drill will be found in the Manual of Field Artillery exercise.

Field Artillery.—The drill of a field battery is almost the same as that of a battery of horse artillery. The space occupied by a battery and the intervals are the same. There are however no mounted detachments and the wagons usually accompany the guns in manoeuvring, though on the battle-field they are supposed to be kept at a safe distance, and if possible under cover. The gunners are carried on the limbers and waggons when the battery moves faster than a walk. The provision of gun axletree seats now enables a sufficient number of men for the service of the gun to be kept with it under all circumstances.

Siege Artillery. The drills for the service of siege guns are numerous. Travelling carriages being used, the drill employed is a medium between field and garrison gun drills, and comprises unlimbering, limbering up, the loading firing &c. the mode of taking post, "under cover and at the gun.

Mortar drill would also come into this section and embraces the manner in which the travelling mortar beds are unlimbered and placed on the ground, and the converse operations, the detachment taking post at the mortar, the preparation for action, the mode of laying the mortar, loading firing &c. The laying of platforms also forms an important part of the duties of siege artillery. "Knotting" and the use of ropes and tackles is an essential branch of the drill. A siege artillery man must be instructed in all the materials and appliances used in moving ordnance. Chains, levers, handspikes, fulcrums, skids, planks, rollers, crab capstans lifting jacks &c. all enter into his work. He must also be acquainted with the numberless operations by which siege guns are moved when dismounted, the mode of mounting and dismounting them, while the drills for guns, sling waggons, sling carts, sheers &c. are particularly his province.

Garrison Artillery. The drills for Garrison Artillery embrace all those that come under the head of siege, but further, comprise

all the drills and exercises with heavy ordnance such as drills with heavy garrison standing carriages, traversing platforms and Moncrieff carriages, and with the enormous 10 " 11" and 13 " guns fitted with special mechanical contrivances for loading, and traversing, mounting and dismounting of heavy ordnance, and all kinds of work with sheers and derricks. The Garrison Artillery are also trained in the ordinary duties of infantry, viz, carbine, company, and battalion drill. All artillery men are further instructed in the laying of ordnance, judging distance and in the various laboratory operations which gunners are required to know, the handling of all kinds of projectiles fuzes &c.

Elephants are some times used in India for the transport of field guns and mortars in a mountainous country. There is no drill laid down by regulation, the main point being to get the gun or mortar off the elephant quickly. For this purpose the elephant is made to kneel down and long skids are placed against the 'cradle' so as to form an inclined plane from the ground to the cradle on the elephant. The gun or mortar is then got off the cradle and down the skids by means of tackle and levers.

In 'position artillery' the drills used are to be found, for the 40 pr. Armstrong on travelling carriage, in the manual of artillery exercises.

The work to be done by an artilleryman is very varied. Instruction and drills in all the materials and appliances for moving ordnance, in the numerous artillery machines, in mounting and dismounting ordnance, all kinds of work with sheers and derricks. Embarking and disembarking guns &c, must all be learnt.* In addition he has similar work to that of an infantry soldier viz : carbine company, and battalion drill.

This brief sketch may perhaps give the reader an idea of what the duties and work of an artilleryman are.

The uncombined tactics of artillery. These may be looked upon as the principles which should guide the handling of artillery and the fire of guns without reference to the combinations with the other arms.† Under this head therefore would come the choice of artillery positions, so far as the choice is given to the artillery commander.

In manoeuvring batteries it is laid down that no fixed *right* or *left* is acknowledged, but only the front to which the guns point when in action or the horse's face when limbered up. The paces used for the walk, trot and gallop and according to Taubert the trot is the most important. With us field batteries are strictly enjoined not to move beyond a trot, but there are occasions on which it is necessary for a

* See Manual of Artillery exercises.
† (See Tactics.)

battery to move at its quickest possible pace, and in Germany this is recognised and acted upon. Field Artillery has increased in mobility by the recent change in material and the provision of axletree seats, so that there is no longer danger of a gun coming into action without a sufficient number of gunners to work it. Stress should therefore be laid on battery manœuvres with wagons at safe distance taking advantage of cover, but conforming to the movements of the guns. Columns of Artillery are composed of batteries, half batteries, divisions, sub-divisions, and columns of route. The successive march of sub-divisions (*i. e.* one gun and wagon) divisions (2 sub-divisions) or half batteries (3 sub-divisions), to front or rear is called "direct echelon," and is adapted to resist attacks in front or flank. "Oblique echelon" is merely a similar movement oblique to the former front.

Taubert divides Artillery columns into (1) the column of march (2) the rendezvous column (3) the column of manœuvre; with us the first is usually the "column of route" on single file, each waggon following its own gun in a long string. In the German army the guns come first and then the waggons. This has the great advantage of not hampering the line of march and is peculiarly adapted to the use of artillery with a large advanced guard. Columns of divisions may be used on a very broad road. 2 Rendezvous columns are open columns with the guns at full interval so as to admit of guns &c., reversing or taking ground to right or left. The column of manœuvre may when cover exists be formed at close interval, but never so under fire. A close formation enables batteries to get near an enemy unseen and the Commander has the force well in hand, but this advantage should not weigh with the necessity for opening out for fire at the earliest moment. The best formation on the battle field is that which admits of the easiest deployment for action.

Manœuvres at drill, requiring smartness and good driving are no doubt of value as a method of training, and so long as they do not smother the true tactical essence of artillery *i.e.*, to move so as to bring the most destructive fire on your enemy at the least cost to yourself. That the spirit of tactics is often lost in the worship of the form, drill, is not to be doubted but requires to be appreciated and vigorously counteracted. Unfortunately the excellent directions in the drill-book are not always followed. "The *nature of the ground* should govern the positions of the guns even on ordinary field days; on the other hand it is probable that positions will not be changed so frequently as in times past and an elevated position is naturally good when it commands the country. Shell firing against troops under cover will enter largely into the use of artillery in future battles, and for this object neither flat trajectories nor low positions are of use. The idea of the enemy forming at the base of the height on which your guns are perched, an objection urged against elevated positions is hardly worth considering. An elevated position does not mean the top of a cliff, nor do we usually place guns where they are unflanked by any

fire whatever. It is quite incorrect to lay down any precise rule that this or that position is the best possible.

The construction of gun pits and epaulements for the waggons should be an important part of drill.

Positions for Artillery must naturally be dependent on the character of the ground and the objects to be executed by the guns. But where a choice exists we must be guided by principles which secure us the vantage ground. A flat trajectory for our guns is highly important in diminishing the safe space for the enemy, and with this view a very elevated position is to be avoided. Such position is also bad if percussion fuzes are used and the soil which the enemy occupies is soft. On the other hand artillery do not now change their position so frequently as in times past, and are more constantly required to fire over the heads of their own infantry, and a position sufficiently elevated to give a good command of the country and search out the enemy's position is therefore more required than formerly; shell firing against troops under cover will also enter largely into the use of artillery in the future, and for this, command is of importance. A point of 1st importance in selecting a position is the absence of cover for the enemy within range of infantry rifle fire, and the position should be such that advance or retreat is easy. The brow of a hill where the guns can be partly, and the limbers and waggons entirely covered by being withdrawn is generally advantageous. The ground should be neither heavy nor stony. A good deal of controversy has taken place about the dispersion or concentration of guns for fire. If the object i.e., concentration of fire can be attained by dispersion of batteries, it may be better under certain circumstances of ground to separate than to collect the Artillery into large masses, on the other hand dispersed batteries are much more out of control and unable to receive the directing impress of one mind, and usually the employment of large masses of artillery will have a greater moral effect. The one object concentration of fire must be attained.

The most powerful and effective position in which Artillery can be placed, is that, in which acting on a flank it enfilades or takes in flank the enemy's troops. A remarkable illustration of this was given by Frederick the Great at Rossbach. At the battle of Talavera July 28 1809, the British guns changed position to the right, advancing from the left flank, and brought a destructive fire to bear on the French columns attacking from the centre of their line. At the battle of Bautzen May 21, 1813 Napoleon's great manœuvre in sending Ney to attack the right rear of the allied position, was frustrated by the fire of 20 Prussian guns taking Ney's columns in flank on the march.

The battle of the Alma September 20, 1854 gives an example of the effect produced by the enfilade fire of a few guns. Two guns of Turner's battery boldly advanced to a knoll which had been left

unguarded almost in the centre of the Russian position, took the Russian columns in flank and with such effect as almost to decide the fortunes of the day.

It has been explained that in the early days of Artillery tactics, guns had been occasionally massed, but usually with no clear aims as to their functions, nor was this state of things altered until far into the Napoleon Era. It was at the Camp of Boulonje in 1805 that a truer system of tactics was first practised, and it was at the battle of Friedland on the 14 June 1807 that the first striking example of the effect of Artillery when employed on masses was given. The Russians had crossed the river Alle and taken up position in front of the town of Friedland. Ney had been ordered by Napoleon to drive back the Russian left and occupy Friedland but had met with a severe check when the French Artillery General Senarmant collected the divisional Artillery of the 1 Corps and dividing it into 2 batteries of 15 guns each with a reserve of 6 guns placed a battery in each side of the road from Eylau and by a converging and destructive fire of case broke the Russian columns, defeated all attempts on their part to resume the offensive and finally drove the Russian left into the narrow defile and re-entering bend of the river.

At the battle of Wagram 6 June 1809 Napoleon pivoting on his left, advanced his right turning the Austrian left and attacked the centre with a mass of 100 guns. This imposing display of artillery power covered the French centre and fixed the attention of the Austrian Commander to the point, while the left was enabled to execute its turning movements. The French Artillery however suffered excessively, the range being too short and the want of mobility of the field batteries conspicuous.

LUTZEN OR GROSS-GORCHEN.

Was fought May 2, 1812 between the allies and the French. The former had 438 guns, the latter only 236. The Artillery of the Russians and Prussians was not well handled, the fire being kept up in a dispersed and thriftless manner, the guns being scattered between the infantry columns, and no powerful reserve being formed. Napoleon reserving the artillery power he possessed brought up a mass of 80 guns at the decisive moment.

GROSS-BEEREN.

Fought on the 23rd August 1813 between the French under Oudinot and the Allies (Russians, Prussians and Swedes) under Bernadotte. In this battle an overwhelming fire of Artillery was brought to bear on the French position by a mass of 64 guns and the position carried covered by this fire.

WARSAW.

The coup-de-main by which the Russian General Paskievitch took Warsaw September 7th 1831, affords an example of the enormous

power gained by massing guns. The outworks were taken on the 6th by the fire of 120 guns, and on the 7th 200 guns deployed, and notwithstanding the admirable movement of 30 guns of Polish Artillery, which took the Russians in oblique, the Russians were victorious.

Hanan fought October 30th 1813 between the French under Napoleon and the Allies under Wrede. Napoleon was retreating from Erfurth after his defeat at Leipsic. Wrede barred his retreat, holding the issues of the forest of Hanan. It was only by Drouet's skillful concentration of fire from three gradually reinforced masses of artillery pouring a concentrated fire upon Wredes large battery of 60 guns, that enabled Napoleon to beat his way out of the forest.

SOBRAON.

Indian warfare affords an example in the Battle of Sobraon, February 10th 1843 of the great maxim of preparing the way for infantry by Artillery fire. 36 guns fired for 2 hours on the Sikh intrenched camp, and enabled the British troops to attack successfully.

INKERMANN.

November 5th 1854. The Russians deployed 96 guns, while the Allies only brought fifty guns into position. These guns however were ably handled and supported the Infantry while the Russian mass from want of tactical mobility failed to produce an effect corresponding to its size.

ITALIAN CAMPAIGN 1859.

In the earlier affairs of this campaign a close country prevented much use being made of the artillery. At Solforino both Austrians and French massed considerable numbers of guns. Some instances occurred in this battle of massing guns and notably when the Austrians endeavoured to penetrate the French position on the right, a mass of 42 French guns prevented the enterprise being carried out.

In the American civil war M'Clellan was saved at Malvern Hill June 1862 by massing 60 guns on his centre. At Frederidesburg the Southern Artillery, 250 guns, were massed in large batteries.

CAMPAIGN OF 1866 (BOHEMIA.)

In this campaign the victorious Prussians made but indifferent use of their Artillery. On the other hand the Austrian Artillery won the deepest respect for its noble conduct, and the admirable manner in which it was manœuvred and fought.

At the great battle of Koniggratz (Sadowa) the Prussian Artillery could scarcely hold their own, while the Austrians were served most devotedly and skillfully by that branch of the service, large masses being used and the guns protecting to the last the retreat of the army. In this battle there were 600 Austrian and 800 Prussian guns. At Trau-

tinau, Nachod and Skalitz little use made by the Prussians of their guns. It must be remembered however that it was work of great difficulty to get guns through the defiles of the giant mountains in time for the actions by which they forced their way out. The Austrians, were able to place their guns so as to command the issues and at Trautenuau the good service done by their Artillery was conspicuous.

THE FRANCO-GERMAN WAR 1870-71.

The lessons of 1866 were not lost upon the Prussian Artillery. The mobility was greater and it was handled with skill and forwardness. In this campaign artillery was always pushed on with the advanced guard, the corps Artillery was well to the front with the main body, and large masses of artillery were deployed and used with success. Very distant firing (that vanity of military theorists) was but little practised, though the precision of rifled guns and the opposing small arms, make it desirable and necessary to keep at a safe distance. The early employment of artillery and the use of large masses of guns were distinctive features in this campaign.

At the Battle of Wörth more than 100 guns were massed and played upon the French position. At Gravelotte the Germans deployed over 200 guns in the attack on St. Privat. At Sedan guns were pushed forward even in front of the advanced guard ; and the battle itself culminated in the German Artillery forming an immense circle of guns enclosing the French army.

The battles which succeeded the final disaster of Sedan were frequently, and especially near Paris, masked by the power of the Artillery alone, to crush and disperse the brave but ill-disciplined French levies.

The following shows the number of guns used on the German side at each of the battles. Weissenburg, 90 ; Wörth 231 ; Spicheren 78 ; Barny 137 ; Mais-la-Tour, 222 ; Gravelotte 616 ; Beaumont 222 ; Noisville 180 ; Sedan, 599 ; Coulmiers 110 ; Amiens 138 ; Beaune-la-Rolande 96 ; Villiers and Champigny 150 ; Orleans 388 ; Brangency 293 ; Bapaume 72 ; Le Mans 234 ; St. Quentin, 161.

In future wars we may expect to see Artillery largely employed, aided by mechanical contrivances to find the range of an object. That Artillery will increase in importance cannot be doubted, but at the same time we must be cautious to remember the difficulties attendant in a huge number of guns, and be prepared to lessen if we cannot overcome them.

With the range and precision of modern guns, positions will not perhaps be changed so often by Artillery as was considered necessary a few years back. Protection for the guns will be more than ever necessary, and the commander who can with guns under cover bring a concentrated and sustained fire on the enemy's position, will fulfil one

of the conditions of success. The *mitrailleur* may be expected to aid field artillery, and in defensive positions, and in these points of the battle field where its employment will dispense with large numbers of troops, it will be most valuable.

The employment of escorts with artillery is a question which urgently needs an answer. Large escorts of infantry fritter away the strength of the latter, while permanent escorts comprised in the battery itself appear to be an expensive, and unnecessary addition to the artillery. It is possible that a small force of mounted infantry would fulfil the duties required with economy and efficiency. Those who assert that war alone can solve the many problems which are uppermost in the minds of the soldiers of the present day, seem to forget, that an army which has not modern experience of its own to guide it, should leave nothing untried which the experience of other nations may suggest.

The puerile cry against imitation is the only rejoinder which can be made to those who desire improvement. Those who join in that cry incur a grave responsibility in attempting to prevent the experience of others from reaching the system of tactics of our army. If their advice prevail in the future, it will bear disastrous fruit.

The writer has not touched upon such subjects as encampment of Artillery, its transport by sea and rail, its march by road, its embarkation and disembarkation. Imperfect as this paper is, he has endeavoured to place succinctly before the reader the history, organisation and administration of Artillery, as well as the technical and tactical features which distinguish it as a special branch of armies. The field for an Artillery officer is large even in the purely technical part of his profession. That field widens continually in the development of modern tactics and warfare. In the wars of the future the Artillery officer may expect his arm to play even a more important rôle than in the past. He himself must train for that time by careful preparation, and work. The time will certainly come when Artillery officers will be entrusted with army commands (as in India) and it is for them to show that if weighed in the balance they will not be found wanting. If the writer can think that the foregoing essay has contributed, however slightly, to the knowledge which should be possessed by Englishmen, of the arm to which our country owes so much, the labour bestowed will be a grateful recollection.

II

PERSIA

ITS PHYSICAL GEOGRAPHY AND PEOPLE.

A Lecture delivered by Major St. John, at Simla, on the 12th July 1877.

If asked which is the most interesting of the countries included in what is rather inappropriately called "the Gorgeous east," the answer of most people would, I believe, be "*Persia*." This notoriety is no doubt mostly due to the halo of romance thrown over all that is Persian by the Arabian nights and Lalla Rookh, the sources from which popular English ideas on oriental subjects are mainly derived ; but it has more solid foundation in the fact that Persia alone of the ancient Kingdoms of the earth still holds a name and a place among nations, and that her language is studied in Europe not only for the surpassing simplicity of its structure, and the elegance of its diction, but for the beauty of the poetry enshrined in it by the Genius of Hafiz and Saádi, of Omar Khayyam, and Firdausi, the Anacreon and Horace, the Lucretius and Homer of the East, and in truth Persia, while in many respects the most oriental of oriental countries, is, in some ways nearer Europe in thought and feeling than any other, and therefore touches more readily and more closely the sympathies of the western world. Yet in spite of the interest inspired by the country of Cyrus and Zoroaster, of the Gulistan and the Shahnámah, of the veiled prophet, and Shahr-i-zad, Queen of story tellers, it is curious to see how little is really known about modern Persia by ordinarily well educated people. Happening to be in London when the Shah made his European tour a few years ago, I was naturally deluged with enquiries about him and his Kingdom, whence I had just returned after a nine years residence, and I was amused to find that the two solid facts that the world in general flattered itself on possessing, were, that all Persians are fire worshippers and that Baghdád is the capital of the country ; the latter a belief not very long ago shared by some departments of the public service in India. Now I will not insult you by supposing your knowledge of Persia to be so limited as that of my London friends, who had never been East of the Cape ; but if it is not more extensive than was mine, when I first landed on the shores of the Persian gulf some thirteen years ago, the brief discription of the country I am about to give you will not, I hope, be altogether stale and uninteresting.

Not that there is any want of literature on the subject written from every possible point of view ; the two extremes being perhaps the works of Sir John Malcolm, whose "sketches of Persia," one of the most charming books of travel ever written, show every thing "couleur de rose" to the Caravan Journey of Mr. Arnold, the latest pilgrim, who

Note. For some years after the detachment of Officers and men of the Royal Engineers employed on the Telegraph went to Persia, letters on certain subjects were regularly addressed, "To the Officer Commanding R. E. in Persia, Bagdad."

seems to have seen every thing through a very atrabilious pair of spectacles. For a true, unprejudiced and nave account of the country nothing has been written equal to the ponderous folios, published early in the 18th century by Chardin, a French jeweller, who made two journeys to Persia, where he spent some years at the court of the Safavi Sháhs, and who, after an adventurous life, ended his days as Sir John Chardin, knight and alderman of London. The best modern book on Persia is I think one written by Mr. Binning, a Madras civilian, who passed a couple of years furlough at Isfahan and Tehran some five and twenty years ago, and whose knowledge of the language was so complete, as to be remembered by learned men long afterwards. To any one who wishes to study Persia I venture to recommend these two books. But this is a digression.

The country that we call Persia, and its inhabitants Irán, or Irún, occupies the western and larger half of the great elevated plateau that stretches over 16 to 18 degrees of longitude between the valleys of the Tigris and the Indus. Afghanistan and Baluchistan occupy the Eastern and smaller half of the plateau, which may be described in relation to the general mountain system of the old world, as a section with a huge spur or buttress protruding southwards of the great dividing range which forms the backbone of the Europeo-Asiatic continent. On the North West the highlands of Armenia, one of the theatres of the present war, unite the Iranian plateau with the mountains of Asia Minor; and on the North-East the Paropamisus and the Hindu Kúsh connect it with the Himalayas and the loftier but less extensive Thibetan plateau. Between the two it is bounded on the north by the vast desert steppes of South Russia, Khiva, and Búkhara, with the intervening depression forming the Caspian Sea. On the Southwest the valley of the Tigris with its continuation, the gulf of Persia or Sea of Omán; on the the South the Arabian Sea; and the Indus valley on the East, form the other limits of the Iranian plateau, which covers in round numbers somewhat over a million square miles, more than three fourths of the extent of the continent of India. Its average elevation above the sea level is about 4000 feet, varying from 8000 feet in some of the outer valleys to 500 feet or less at the coast and in the more depressed portions of the centre. Now, it is this greater elevation towards the edge that gives the Iranian plateau its unique character. The highlands of Spain and of Mexico, the plateau west of the Rocky mountains are not dissimilar in many respects, but differ in draining entirely or nearly so outward to the ocean. But of the Iranian plateau the ocean drains only 230,000 square miles, and the Arabo-carpian depression a little more, leaving some 550,000 square miles, a tract more than 2-5ths of the size of the continent of India, or equal to Great Britain, Germany and France together, to the interior drainage. Three rivers only, the Kur, the Araxes, and the Safid sud, all in the extreme north west corner of the plateau, and all flowing to the Caspian, have a course from source to mouth of more than 200 miles as the crow flies. With these exceptions

no ocean flowing river on the Iranian plateau has its origin more than 150 miles from the foot of the scarp, and the average breadth of the lip of the basin, for as such the plateau must be considered, hardly exceeds 100 miles. Its interior is, as it were, irregularly honey combed into numerous depressions, divided by mountain ridges more or less lofty. The most noticeable of these depressions is the water system of the Halmand, which drains into the Sistan lake, and covers an area of 150,000 square miles or more. It differs much in important features from the rest of the Iranian plateau, being more uniformly mountainous, and intersected by more important streams, but, lying as it does almost wholly in the country we now call Afghanistan, and therefore outside modern Persia, I will not enlarge on it further, but turn to the geography of *Persia proper*, as the term is understood in Europe. The present kingdom of Iran, as before mentioned, occupies nearly all the western and larger half of the Great plateau of which a general outline has just been given. The exception is the chain of the Caucasus, the valley of the Kur lying at its southern foot, and the northern slope of that of the Araxes. These form what are usually termed the Caucasian provinces of Russia, and were until conquered by that power partly independent, and partly subject to Persia or Turkey. Physically they undoubtedly form part of the Iranian plateau.

Thus limited, the realms of the Shah-in-Shah cover a large irregular triangle, with an area of about 620,000 square miles (nearly half that of India) surrounded on all sides by a mountain barrier, shutting off the interior drainage from access to the ocean or to the Arabo-Caspian basin. On the East this barrier is formed by the highlands of Khúrasán, a mountainous region, until lately left blank on our maps, separating the Halmand basin and the Baluch desert, South of it from the Great Salt desert and the desert of Kármán. The northern barrier is formed by the Alburz chain, which links together the Anticaucasus and the Paropamisus; and the South western by the mass of parallel ridges as yet very imperfectly explored, extending from Armenia along the Eastern edge of the Tigris valley and the Persian gulf into the coast ranges of Baluchistan. Without a diagram it is not very easy to give an accurate idea of the drainage areas; suffice it to say, that a line drawn parallel to the outward edge of the scarp at 100 miles distant would approximately show the waterparting. This has nearly the form of an isosceles triangle, having its apex about the city of Meshed, its sides being about 700 miles long, and its base parallel to the gulf and the Tigris about 1000 miles.

Thus of the 620,000 square miles included in Persia proper only 130,000 drain South to the ocean, about 100,000 to the Caspian, and 40,000 Eastward to the Halmand basin and the Baluch desert; leaving 350,000 to the interior drainage.

We now come to the second great physical fact which distin-

guishes the Iranian plateau from its neighbour northern India, the first being its high general altitude. Not long ago an Indian Muhamadan Gentleman was questioning me, as they are very fond of doing, about Persia, and when I told him that its main superiority over India consisted in its having neither grain dealers nor rainy season, neither *bunrias* nor *bursat*, he evidently either doubted my veracity or conceived the meanest idea of the vaunted attractions of Irán. In fact Persia lies a long way outside the range of the Southwest monsoon, whose influence is unfelt beyond a line from Ras al Hadd the S. E. corner of Arabia to the mouth of the Indus. Immediately inside this line is a region of calm in the atmosphere, a sort of backwater as it were, extending as far as the entrance of the Persian gulf. Over this area little rain falls at any time, the Makrán coast and parts of Omán being shown, strictly speaking however, erroneously, as absolutely rainless districts. Beyond this again we enter what is called by Geographers the Zone of winter rains, which extends through Persia and Asia Minor as far as Central Europe. Not that there is anything like the rainy season of Simla in this Zone of winter rains, the term being simply used to imply that the greater part of the rainfall occurs during the winter and spring months, instead of being concentrated in three mouths of the autumn as in northern India, or spread over the whole year as in England. Now this is a most important point modifying not only the climate and the seasons, but the physical appearance of the country in a very extraordinary manner. In India we have three seasons, cold, hot, and rainy. In Persia, as in England, there are four, spring, summer, autumn, and winter. The consequence of this is in the first place later crops under similar conditions of latitude and altitude, from the spring rains keeping down the temperature. The second is that the long dry summer ripens fruits and crops that would be destroyed by heavy rains. Were it not for the monsoon of July and August the hillsides of the Himalayas might be covered with vineyards as are those of Afghauistán and Persia. In India again the major part of the rainfall occurs in a liquid form up to 12 or 15,000 feet above the sea, and comes down in heavy showers. Most of it therefore runs off at once to the ocean unless interrupted by human agency. In Persia on the other hand, the moisture descends, as low as altitudes of two to four thousand feet mainly in the form of snow, which soaks gently into the ground, or is stored by nature on the hill tops for summer use. But for this ninetenths of Persia would be the barren desert that half of it is now. Every one must have noticed both here and in the plains the effect of the unusually heavy and frequent storms during the early months of this year, both in lowering the temperature and in changing the outward aspect of the country. Instead of their usual burnt up look in May and June the hills around us remained green; the corn refused to ripen; ferns and other damp loving plants made thier appearance months before their time. In fact if the regular rains had only, as seemed at one time probable, kept away altogether, you would have had a very fair idea of what an ordinary spring and summer in Persia are like.

Again the actual modelling of the surface of the land in Persia has been largely affected by the fact of the rain falling in winter instead of in summer. Heavy tropical showers, even though infrequent, wear the hill sides into steep slopes, plough deep ravines, and force their way through all obstacles to the Sea, or to some deep depression of the earth's surface ; while a mantle of snow covering hill and dale gently disintegrates the rocks into long slopes of gravel, and forms water-courses hardly below the general level of the soil. Thus in Baluchistan with a low general elevation, and where the rainfall is very small, but is precipitated in heavy showers, we find steep cliffs and deep ravines, unseen in the interior of Persia.

Over so large an area the rainfall is of course very unequal, that on the Oceanic and Caspian watersheds being naturally far in excess of that on the interior ; wherever the waterparting is formed as it generally is, by a lofty mountain chain, this intercepts the moisture bearing clouds from the sea, which discharge themselves on its outer slopes. The Alburz range, which shuts off the plateau from the Caspian may be taken as the typical instance. Its northern face is furrowed into deep valleys by the constant and heavy showers due to evaporation from the great inland Sea, and is clothed with forests of tropical luxuriance, while the Southern face generally presents a single abrupt scarp, rising above long gravel slopes, unchannelled by anything worthy the name of a river, and here of any vegetation rising to the dignity of a tree. At the most moderate estimate the rainfall of the Caspian provinces, Gilán and Mazandarán, may be taken as five times that of the adjoining districts across the ridges to the South. In other parts however we find the waterparting considerably lower than the summits further inland, and here the interior has a more plenteous rainfall than the coast. This is particularly the case in South Eastern Persia, where the Karmán Sarhad and Dizak hills, far exceeding in altitude the ranges to the South, attract to themselves the major portion of the scanty supply of moisture borne inland from the sea.

Again, the rainfall differs very much in different parts of the country under apparently similar conditions as regards mountains and distance from the sea ; the East and South being far drier than North and West, while the dampest parts of the Tigris valley have not half the rainfall of the Southern and South western shores of the Caspian. The vegetation as a matter of course follows the rainfall. On the Caspian coast we find forests equal in magnificence to any in the world ; the Western slopes of the Zagros and the mountains of Fars are clothed with thick brushwood and sparse forest ; while in the interior trees unplanted by man are never seen, except a few willows and tamerisks in the beds of the infrequent streams.

The prevailing winds of Persia are with extraordinary uniformity N. W. and S. E. The primary reason for this phenomenon is the position of the Black Sea and the Mediterranean on the N. W. and of

the Arabian Sea on the S. E. The secondary reason is the bearing of the axes of the great mountain chains which lie mainly in the same direction N. W. and S. E. and thus tend to guide the currents of the atmosphere in a uniform course. The effect of the sun on the bare hills and desert plains of the great Iranian plateau is to produce a heated stratum of air ; which, rising, is replaced by a current from the colder atmospheres above the Seas to the S. E. or N. W. naturally the latter is the colder ; and therefore N. W. winds are most prevalent. But in Southern Persia and the gulf it often happens that the two currents meet, and that a Northwest is blowing at Bushire, while a Southeaster is raging at Bandar Abbas. The same phenomenon is I believe the rule in the Red Sea. The S. E. is the rain bearing wind throughout the greater part of Persia, the exception being the Northwest, where occasional rainclouds from the Caspian and the Black Sea find their way across the Kurdish mountains or the Elburz.

In the absence of statistics it is impossible to give more than an opinion as to the amount of rainfall in Persia, but I believe I am well within the mark in stating that no part of the country, with the exception of the Caspian provinces, the Northern coasts of the gulf, and the Tigris valley, has an average rainfall of ten inches a year taking hill and valley together. Throughout the greater part of Central and South Eastern Persia the annual fall cannot be more than 5 inches.

The whole of the interior plateau of Persia is divided by mountain ranges into long valleys or rather plains, many without outlet, and having as before mentioned, a generally uniform N. W. and S. E. direction. The lowest part of each is generally a salt lake or marsh. Their elevation varies considerably, some of the valleys immediately East of the watershed of the Tigris rise to the height of 8000 feet and of course are covered with snow from early winter till the beginning of summer. But the general level of the country is much lower. The plains of Shiraz, Persepolis, and Isfahan are about 5000 feet above the sea ; Karman lies about 500 feet higher ; Tehran, Mashad and Yazd below 4000 feet. Generally as we recede from the West and North the intervals between the ridges are wider, the elevation lower, and the rainfall smaller ; till grassy valleys are replaced by gravelly deserts, sparsely clad with low brushwood, which again pass into wastes of shifting sand. These, as in Central Asia, occasionally invade the cultivated tracts wherever artificial irrigation is intermittent ; the ancient historic city of Rheges, 30 miles S. E. of Tehran, commemorated in the story of Tobit, is said to have been abandoned on this account.

But the most remarkable feature of the plains of Persia are the salt lakes, and the salt swamps called Kafeh or Kavir. The usual condition of the alluvial soil of the Persian plateau appears to be that wherever exposed to sufficient moisture, either by the overflow of rivers, or want of slope to carry off the scanty desert rainfall, a saline efflorescence is produced, which forming a thin crust on the surface

retains the moisture beneath for a considerable time, and thus creates a treacherous bog often impassable for the greater part of the year. The appearance is very similar to that of the "reh" so common in parts of Northern India, but the salt is different, that of the Persian "Kavir" being chloride of sodium, common edible salt, and "reh" being sulphate of sodium. Where the supply of water is great shallow lakes are formed, always salt and often intensely so; such as those of Urmia, Van, and Niriz. The large volume of fresh water poured into the Sistán lake by the Halmand keeps its waters brackish only, but it is the only sheet of water of any size in Persia in which animal life save in its lowest forms is known to exist. A great part of the surface of all these lakes is laid bare in dry seasons by evaporation, and they differ therefore in degree only, from the salt swamps of Kavirs proper. Here a bog of shiny mud is formed in the lowest depression, covered with saturated brine in winter and in summer by a thick crust of crystallized salt. Mr. Blanford and I crossed two of these Kavirs or Kafehs as they are locally called, between Karman and Shiraz in May 1872. A narrow track, perhaps originally an artificial causeway, led across the slippery waste of mud, covered with saline efflorescence and interspersed with pools of brine, which edged the Kafeh proper. A step off the pathway let horses in up to their hocks. Further on a thick crust of solid white salt through which horses feet did not break indicated the lowest part of the depression. A hole made in the crust showed a fetid black mud fathomless by our sticks.

The most remarkable of the Kavirs is that called on maps the great salt desert of Khorassan, or Daria-i-Kabir, i.e., the great sea. This is I believe a misnomer though it has the authority of Mr. Morier, the author of "Hajji Baba" to back it. The name I have always heard applied to it, is, *Dasht-i-Kavir*, the plain of the salt swamp. Though crossed by numerous paths it has never been explored, and its central depression has only once been seen by a European, Dr. Buhsé a Russian, who crossed it, when travelling from Damghan to Yazd. He describes it as six miles wide and covered by a thick crust of salt. It thus apparently closely resembles the Kafeh near Karman I have just described. The Dasht-i-Kavir is said by Persians to extend from near Kashan, to near Turshíz say over six degrees of longitude or 300 miles. But it is far from certain whether it is a continuous trough throughout this great distance, or a chain of depressions like those lately discovered by Lt. Colonel Macgregor in the Baluch desert. The saline efflorescence however extends continuously round it to a great distance, and forms the salt desert seen by travellers from the Tehran-Meshed road.

The height of the mountains of Persia is far more considerable than map makers have been pleased to allow. Damavand, a volcanic cone near Tehran, marked on atlases as 14,700 feet above the sea, has been recently fixed by Russian surveyors at 18,600. The great range of Dinar in western Fars is covered with snow for three to four thousand feet from the summit in autumn. The snow line can be little less

in latitude 30°, then 14,000 feet, and I therefore judge these mountains which are quite unexplored, to be from 17 to 18,000 feet. Many peaks in Kurdistan and the Lagros are probably little less. The district of Sardu, crossed by Marco Polo between Ormuz and Karmān, has mountains over 14,000 feet, in height and the higher summits of the Elburz exceed 12,000. Travellers have probably misjudged the heights of the Persian mountains from having taken the snow level at the Swiss instead of the Himalayan figure, and perhaps also from the extraordinary purity of the atmosphere.

I have given you I fear, a great many dry details on physical geography, but before passing to a more general description of the country and its inhabitants, I must ask you to listen to a few words on the political frontiers of Persia, of which we are not unlikely to hear a good deal before long. I need not say that the ancient kingdoms of Darius and Xerxes, of the Seleucidæ and the Sassanians covered a great deal more ground than the dominions of the present Shâh-in-Shâh. But the Persian Empire of the sixteenth century, its latest period of wealth and power, when the Safavi kings held their courts at Isfahan, and our predecessors the Moguls at Delbi, differed in one very important respect from the Persia of to-day. I mean that till less than a century and a half ago Afghanistán had no political existence. The western half of the country, now so called, formed an integral part of Persia, and its eastern half belonged to India. The Safavi monarchs held Merv and Herat, and were thus able to keep the wild Turkman freebooters in check; the Moguls ruled through their lieutenants at Cabul and Ghazui, and thus held the frontier of India proper, securely against western foes. Constant wars for the possession of Kandahar were carried on between the two Empires, the final victory remaining with India. The importance of its capture was shown when Nadir Shâh, after deposing the last Sufi King, attacked the Mogul Empire in its decadence. Kandahar arrested his progress for 14 months, and Kabul for two more. Once captured their defenders swelled the ranks of his army, and half at least of the troops with which he entered Delhi were Afghans. The wasted cities and mined watercourses of Halmand and Murghát valleys show clearly enough that the partition of Afghanistán between her more powerful neighbours was a better arrangement, not only for them but for its own inhabitants, than that now existing.

The river Aras, the ancient Araxes, now forms the frontier of Persia from near mount Ararat, the summit of whose eastern peak marks the meeting point of Turkey, Persia and Russia. After their last war with the Persians in 1828 the Russians secured to themselves both banks of the river near its mouth, and with them exclusive right to the valuable fisheries. They also retained a sufficiency of ground on the Persian side opposite Julfa, on the main road from Tabriz to Tiflis, to form a *tête de pont*, and thus secure the passage of the river without opposition. East of the Araxes, Persia holds the shore of the Caspian Sea from the little port of Astara on the west coast to the mouth of the Kara-su at

the south east corner near Astrábád. Russia made an informal arrangement some six or seven years ago that the mouth of the Atrak some 20 miles to the north was to be the frontier, but it appears that the Governor of Ashurada, the Russian naval station, continues to exercise authority over the country between the two rivers.

The natural frontier of Persia in these parts is clearly the desert north of the Balkan, Kopet and Kuren ranges, but Russia has already formally annexed the two first, and is credited with designs on the third, though a considerable portion of it is in *de facto* Persian occupation.

Further east we have the ancient city of Merv, long the outpost of Persian and Arab civilization against the barbarian hordes of Central Asia, now a debateable land of which we have heard a good deal lately, and shall doubtless hear a good deal more in the course of the next few years. At an uncertain point near Merv the Persian and Afghan boundaries begin to march. For some distance to the south the river Tejend is believed to form the common frontier of the two countries, but little is known of these wild border lands except where crossed by the roads from Mashad to Herat, until we come to Sistan, where the boundary was determined by Sir Frederic Goldsmid's arbitration in 1872. South of Sistan is another long stretch of wild half desert country, practically independent of any authority, reaching to the settled districts of Baluchistan and Makrán, where the extent of the dominions of the Khán of Kalát to the west has been recently fixed by arrangement with Persia.

Most of the ports on the Sea Coast of the Arabian Sea and the Persian gulf had fallen into the hands of the Arabs of Omán during the long period of anarchy which desolated Persia in the latter half of the last Century. Tribute in some form seems generally to have been paid to Tehrán, but the arrangement, though supported for a long time by the British Government, did not work satisfactory, and the Shah has gradually resumed complete authority over the sea ports, till now no flag but his own flies from Gwatar to Muhamrah. From the latter town, bombarded by our fleet in 1857, the Asiatic dominions of the Sultan of Turkey march with Persia as far as Mount Ararat, a distance, somewhat exceeding 800 miles. The intervening country is at first sandy desert, strewed with ruined cities and dried up canals, wrecks of early civilization destroyed by the Bedouin and the Turanian, and further north wild mountains inhabited by wilder tribes, lineal descendants probably of the hardy mountaineers who obstructed the retreat of the ten thousand Greeks from Cunaxa, and strove gallantly but in vain to arrest the progress of the conqueror of Macedon. Chronic irregular warfare between Turks and Persians was the state of affairs on this frontier till 1850, when an Anglo-Russian commission was appointed to survey the country. Its British member was Sir William Williams, then a colonel of artillery, later on famous for his gallant defence of Kara. The survey was completed before the Crimean

war, but the maps were not finished till 20 years later, and the boundary line has not yet been laid down. (1)

These are the political limits of modern Persia, concerning which it may be remarked that hardly in any spot do they represent a clearly defined ethnological division. On the West we find Persian Kurds and Turkish Kurds, Persian Arabs, and Turkish Arabs. Most of the coast villages are Arab. In Baluchistan the inhabitants in the vicinity of the frontier differ only in paying tribute to Sháh, or Khan. The people of Herat are far nearer of kin to their Persian enemies than to their Afghān masters, and though the Turkman frontier is better defined ethnologically, at least one Turkman tribe is subject to Persia.

I fear that the barren details I have recited have not done much towards giving you an idea of the outward appearance of the country itself, and perhaps the best way to do this is to ask you to accompany me in an imaginary trip, let us say from Bushire on the Persian Gulf to Resht on the Caspian, a ride of about a thousand miles. This will give you a sort of section of the country, and, without a section, we engineers think that nothing material can possibly be understood. Let us suppose then that after dawdling along the Makrán coast to Maskat, and so on to Bandar-Abbas in a steamer of the British India Steam Navigation Company for ten days, we are steaming along the North shore of the gulf with the wind towers of Bushire just in sight a head. Range above range of barren mountains, not unlike those seen from the Red Sea, rise apparently direct from the water on our right. Through the glass, however, we can see dark lines at the water's edge, which are really date groves on the strip of level plain some ten to twenty miles in width which fringes the coast. If the day be clear as it generally is in winter and early spring, the snow clad hills of Behbehéh and Dinar, 80 to 150 miles off will be visible on the far horizon. On our starboard bow is the little village of Halilah, where our troops disembarked in 1856, and a couple of miles on we may be near enough to see the old Portuguese redoubt of Reshire, over whose ruined ramparts a horse might gallop, but which three hundred Persian villagers armed with matchlocks gallantly attempted to hold against a division of British troops, most of them dying or being taken, but not before they cost our force a brigadier, a colonel, and two other officers killed, besides a large number of men.

The harbour of Bushire cannot be entered by vessels drawing over ten feet of water, so we cast anchor in the roads, three miles off, and are pulled ashore by Arab boatmen. For Bushire is practically an Arab town, until thirty or forty years ago governed by its own Shaikh; and even now having little that is Persian about it, except the garrison,

NOTE (1). This was recently stated in the House of Commons to be the fault of the Persian Government alone, but I believe the fact to be that the Sháh's representative refused to enter into the frontier question till certain acknowledged grievances suffered by Persian pilgrims at Mecca and elsewhere should be redressed by Turkey.

short sturdy men of an Azarbajian regiment, in butcher blue tunics of cotton, dirty white cross belts, and high Astrakhan caps. Persian geographers indeed actually look upon their own coast as part of Arabistán not of Irán, and therefore we will suppose all our arrangements made for a start into the interior, horses bought, servants hired, and a trusty muleteer engaged to convey our belongings to Shiraz. Carts there are none in Persia, though the country above the passes presents few difficulties to their use, and though, if Arrian is to be believed they were regularly used for carrying provisions to the court of Persepolis. On the other hand we need not trouble ourselves with tents, for though there is no paternal government to provide dák bungalows, private generosity has built caravanserais at most of the halting places, which will give a dry roosttree for men and beasts, if nothing else. Even if you choose an unfrequented route and caravanserais be scarce, we shall find that Persia is very different from India as regards the foreign traveller. No caste prejudices exist to damp the natural instincts of hospitality, and we have only to ride into a village and demand shelter to have a home of some sort cleared of its inhabitants by the "*Ketkhuda*," (the village mayor or "Lumberdar") and placed at our disposal for the night. But we must try and forget for a moment that we are the conquerors, of India and drop a little of that haughty manner which is, it must be confessed, necessary to the traveller who wishes to be respected in this country. Our servants will do all the minor swaggering, and though it does not do to be humble, indeed a fair amount of side, is advisable in Persia, we should be affable as becomes greatness, remembering that we are in a country, in which, despotic though it be in most ways, the right of free speech is specially cherished, and must submit to be questioned on every subject under the sun in the coolest manner. But if we be moderately polite and keep our tempers, we shall have no serious cause for complaint, and shall be rewarded by a freedom of discussion and openness of sentiment that will astonish us after the guarded reserve to which we have been accustomed among our dusky fellow subjects in India.

Here then we are on some fine morning in March, trotting through the single gate in the dilapidated ramparts of Bushire. For forty miles our road lies over a dead level plain, part of it a muddy swamp after springtides or heavy rain, but elsewhere interspersed with palm groves and cornfields. Villages are not infrequent, each with a small square mud fort, surrounded by palm leaf huts. The inhabitants are Persians, stalwart men, in tight long skirted dresses of blue cotton or English figured chintz, a brown felt Phrygian cap on the head, long love locks, and a whole arsenal of pistols and daggers in the shawl that girds the tightly pinched waist. For this coast land is a wild country, very unlike the peaceful interior; every village is as a rule at war with its neighbour, and blood feuds are carried out to the bitter end. Apropos of this I will tell you the story of an event that occurred at the little town of Borasjun, occupied by our troops for a couple of days during the war, and which we are now approaching. A young Syud, famous

the Arabian Sea on the S. E. The secondary reason is the bearing of the axes of the great mountain chains which lie mainly in the same direction N. W. and S. E. and thus tend to guide the currents of the atmosphere in a uniform course. The effect of the sun on the bare hills and desert plains of the great Iranian plateau is to produce a heated stratum of air ; which, rising, is replaced by a current from the colder atmospheres above the Seas to the S. E. or N. W. naturally the latter is the colder ; and therefore N. W. winds are most prevalent. But in Southern Persia and the gulf it often happens that the two currents meet, and that a Northwest is blowing at Bushire, while a Southeaster is raging at Bandar Abbas. The same phenomenon I believe the rule in the Red Sea. The S. E. is the rain bearing wind throughout the greater part of Persia, the exception being the Northwest, where occasional rainclouds from the Caspian and the Black Sea find their way across the Kurdish mountains or the Elburz.

In the absence of statistics it is impossible to give more than an opinion as to the amount of rainfall in Persia, but I believe I am well within the mark in stating that no part of the country, with the exception of the Caspian provinces, the Northern coasts of the gulf, and the Tigris valley, has an average rainfall of ten inches a year taking hill and valley together. Throughout the greater part of Central and South Eastern Persia the annual fall cannot be more than 5 inches.

The whole of the interior plateau of Persia is divided by mountain ranges into long valleys or rather plains, many without outlet, and having as before mentioned, a generally uniform N. W. and S. E. direction. The lowest part of each is generally a salt lake or marsh. Their elevation varies considerably, some of the valleys immediately East of the watershed of the Tigris rise to the height of 8000 feet and of course are covered with snow from early winter till the beginning of summer. But the general level of the country is much lower. The plains of Shiraz, Persepolis, and Isfahan are about 5000 feet above the sea ; Karman lies about 500 feet higher ; Tehran, Mashad and Yazz below 4000 feet. Generally as we recede from the West and North the intervals between the ridges are wider, the elevation lower, and the rainfall smaller ; till grassy valleys are replaced by gravelly deserts, sparsely clad with low brushwood, which again pass into wastes of shifting sand. These, as in Central Asia, occasionally invade the cultivated tracts wherever artificial irrigation is intermittent ; the ancient historic city of Rheges, 30 miles S. E. of Tehran, commemorated in the story of Tobit, is said to have been abandoned on this account.

But the most remarkable feature of the plains of Persia are the salt lakes, and the salt swamps called Kafeh or Kavir. The usual condition of the alluvial soil of the Persian plateau appears to be that wherever exposed to sufficient moisture, either by the overflow of rivers, or want of slope to carry off the scanty desert rainfall, a saline efflorescence is produced, which forming a thin crust on the surface

retains the moisture beneath for a considerable time, and thus creates a treacherous bog often impassable for the greater part of the year. The appearance is very similar to that of the "reh" so common in parts of Northern India, but the salt is different, that of the Persian "Kavir" being chloride of sodium, common edible salt, and "reh" being sulphate of sodium. Where the supply of water is great shallow lakes are formed, always salt and often intensely so; such as those of Urmia, Van, and Niriz. The large volume of fresh water poured into the Sistán lake by the Halmand keeps its waters brackish only, but it is the only sheet of water of any size in Persia in which animal life save in its lowest forms is known to exist. A great part of the surface of all these lakes is laid bare in dry seasons by evaporation, and they differ therefore in degree only, from the salt swamps of Kavirs proper. Here a bog of shiny mud is formed in the lowest depression, covered with saturated brine in winter and in summer by a thick crust of crystallized salt. Mr. Blanford and I crossed two of these Kavirs or Kafehs as they are locally called, between Karman and Shiraz in May 1872. A narrow track, perhaps originally an artificial causeway, led across the slippery waste of mud, covered with saline efflorescence and interspersed with pools of brine, which edged the Kafeh proper. A step off the pathway let horses in up to their hocks. Further on a thick crust of solid white salt through which horses feet did not break indicated the lowest part of the depression. A hole made in the crust showed a fetid black mud fathomless by our sticks.

The most remarkable of the Kavirs is that called on maps the great salt desert of Khorassan, or Daria-i-Kabir, i.e., the great sea. This is I believe a misnomer though it has the authority of Mr. Morier, the author of "Hajji Baba" to back it. The name I have always heard applied to it, is, *Dasht-i-Kavir*, the plain of the salt swamp. Though crossed by numerous paths it has never been explored, and its central depression has only once been seen by a European, Dr. Bulsë a Russian, who crossed it, when travelling from Damghan to Yazd. He describes it as six miles wide and covered by a thick crust of salt. It thus apparently closely resembles the Kafeh near Karman I have just described. The Dasht-i-Kavir is said by Persians to extend from near Kashan, to near Turshfz say over six degrees of longitude or 300 miles. But it is far from certain whether it is a continuous trough throughout this great distance, or a chain of depressions like those lately discovered by Lt. Colonel Macgregor in the Baluch desert. The saline efflorescence however extends continuously round it to a great distance, and forms the salt desert seen by travellers from the Tehran-Meshed road.

The height of the mountains of Persia is far more considerable than map makers have been pleased to allow. Damavand, a volcanic cone near Tehran, marked on atlases as 14,700 feet above the sea, has been recently fixed by Russian surveyors at 18,600. The great range of Dinar in western Fars is covered with snow for three to four thousand feet from the summit in autumn. The snow line can be little less

in latitude 30°, then 14,000 feet, and I therefore judge these mountains which are quite unexplored, to be from 17 to 18,000 feet. Many peaks in Kurdistan and the Lagros are probably little less. The district of Sardu, crossed by Marco Polo between Ormuz and Karman, has mountains over 14,000 feet, in height and the higher summits of the Elburz exceed 12,000. Travellers have probably misjudged the heights of the Persian mountains from having taken the snow level at the Swiss instead of the Himalayan figure, and perhaps also from the extraordinary purity of the atmosphere.

I have given you I fear, a great many dry details on physical geography, but before passing to a more general description of the country and its inhabitants, I must ask you to listen to a few words on the political frontiers of Persia, of which we are not unlikely to hear a good deal before long. I need not say that the ancient kingdoms of Darius and Xerxes, of the Seleucidœ and the Sassanians covered a great deal more ground than the dominions of the present Sháh-in-Sháh. But the Persian Empire of the sixteenth century, its latest period of wealth and power, when the Safavi kings held their courts at Isfahan, and our predecessors the Moguls at Delhi, differed in one very important respect from the Persia of to-day. I mean that till less than a century and a half ago Afghanistán had no political existence. The western half of the country, now so called, formed an integral part of Persia, and its eastern half belonged to India. The Safavi monarchs held Merv and Herat, and were thus able to keep the wild Turkman freebooters in check; the Moguls ruled through their lieutenants at Cabul and Ghazni, and thus held the frontier of India proper, securely against western foes. Constant wars for the possession of Kandahar were carried on between the two Empires, the final victory remaining with India. The importance of its capture was shown when Nadir Sháh, after deposing the last Sufi King, attacked the Mogul Empire in its decadence. Kandahar arrested his progress for 14 months, and Kabul for two more. Once captured their defenders swelled the ranks of his army, and half at least of the troops with which he entered Delhi were Afghans. The wasted cities and mined watercourses of Halmand and Murghát valleys show clearly enough that the partition of Afghanistán between her more powerful neighbours was a better arrangement, not only for them but for its own inhabitants, than that now existing.

The river Aras, the ancient Araxes, now forms the frontier of Persia from near mount Ararat, the summit of whose eastern peak marks the meeting point of Turkey, Persia and Russia. After their last war with the Persians in 1828 the Russians secured to themselves both banks of the river near its mouth, and with them exclusive right to the valuable fisheries. They also retained a sufficiency of ground on the Persian side opposite Julfa, on the main road from Tabriz to Tiflis, to form a *tête de pont*, and thus secure the passage of the river without opposition. East of the Araxes, Persia holds the shore of the Caspian Sea from the little port of Astara on the west coast to the mouth of the Kara-su at

the south east corner near Astrábád. Russia made an informal arrangement some six or seven years ago that the mouth of the Atrak some 20 miles to the north was to be the frontier, but it appears that the Governor of Ashurada, the Russian naval station, continues to exercise authority over the country between the two rivers.

The natural frontier of Persia in these parts is clearly the desert north of the Balkan, Kopet and Kuren ranges, but Russia has already formally annexed the two first, and is credited with designs on the third, though a considerable portion of it is in *de facto* Persian occupation.

Further east we have the ancient city of Merv, long the outpost of Persian and Arab civilization against the barbarian hordes of Central Asia, now a debateable land of which we have heard a good deal lately, and shall doubtless hear a good deal more in the course of the next few years. At an uncertain point near Merv the Persian and Afghan boundaries begin to march. For some distance to the south the river Tejend is believed to form the common frontier of the two countries, but little is known of these wild border lands except where crossed by the roads from Mashad to Herat, until we come to Sistan, where the boundary was determined by Sir Frederic Goldsmid's arbitration in 1872. South of Sistan is another long stretch of wild half desert country, practically independent of any authority, reaching to the settled districts of Baluchistan and Makrán, where the extent of the dominions of the Khán of Kalát to the west has been recently fixed by arrangement with Persia.

Most of the ports on the Sea Coast of the Arabian Sea and the Persian gulf had fallen into the hands of the Arabs of Omán during the long period of anarchy which desolated Persia in the latter half of the last Century. Tribute in some form seems generally to have been paid to Tehrán, but the arrangement, though supported for a long time by the British Government, did not work satisfactory, and the Shah has gradually resumed complete authority over the sea ports, till now no flag but his own flies from Gwatar to Muhamrah. From the latter town, bombarded by our fleet in 1857, the Asiatic dominions of the Sultan of Turkey march with Persia as far as Mount Ararat, a distance, somewhat exceeding 800 miles. The intervening country is at first sandy desert, strewed with ruined cities and dried up canals, wrecks of early civilization destroyed by the Bedouin and the Turanian, and further north wild mountains inhabited by wilder tribes, lineal descendants probably of the hardy mountaineers who obstructed the retreat of the ten thousand Greeks from Cunaxa, and strove gallantly but in vain to arrest the progress of the conqueror of Macedon. Chronic irregular warfare between Turks and Persians was the state of affairs on this frontier till 1850, when an Anglo-Russian commission was appointed to survey the country. Its British member was Sir William Williams, then a colonel of artillery, later on famous for his gallant defence of Kars. The survey was completed before the Crimean

war, but the maps were not finished till 20 years later, and the boundary line has not yet been laid down. (1)

These are the political limits of modern Persia, concerning which it may be remarked that hardly in any spot do they represent a clearly defined ethnological division. On the West we find Persian Kurds and Turkish Kurds, Persian Arabs, and Turkish Arabs. Most of the coast villages are Arab. In Baluchistan the inhabitants in the vicinity of the frontier differ only in paying tribute to Sháh, or Khan. The people of Herat are far nearer of kin to their Persian enemies than to their Afghan masters, and though the Turkman frontier is better defined ethnologically, at least one Turkman tribe is subject to Persia.

I fear that the barren details I have recited have not done much towards giving you an idea of the outward appearance of the country itself, and perhaps the best way to do this is to ask you to accompany me in an imaginary trip, let us say from Bushire on the Persian Gulf to Resht on the Caspian, a ride of about a thousand miles. This will give you a sort of section of the country, and, without a section, we engineers think that nothing material can possibly be understood. Let us suppose then that after dawdling along the Makrán coast to Maskat, and so on to Bandar-Abbas in a steamer of the British India Steam Navigation Company for ten days, we are steaming along the North shore of the gulf with the wind towers of Bushire just in sight a head. Range above range of barren mountains, not unlike those seen from the Red Sea, rise apparently direct from the water on our right. Through the glass, however, we can see dark lines at the water's edge, which are really date groves on the strip of level plain some ten to twenty miles in width which fringes the coast. If the day be clear as it generally is in winter and early spring, the snow clad hills of Behbehán and Dinar, 80 to 150 miles off will be visible on the far horizon. On our starboard bow is the little village of Halilah, where our troops disembarked in 1856, and a couple of miles on we may be near enough to see the old Portuguese redoubt of Reshire, over whose ruined ramparts a horse might gallop, but which three hundred Persian villagers armed with matchlocks gallantly attempted to hold against a division of British troops, most of them dying or being taken, but not before they cost our force a brigadier, a colonel, and two other officers killed, besides a large number of men.

The harbour of Bushire cannot be entered by vessels drawing over ten feet of water, so we cast anchor in the roads, three miles off, and are pulled ashore by Arab boatmen. For Bushire is practically an Arab town, until thirty or forty years ago governed by its own Shaikh; and even now having little that is Persian about it, except the garrison,

NOTE (1). This was recently stated in the House of Commons to be the fault of the Persian Government alone, but I believe the fact to be that the Sháh's representative refused to enter into the frontier question till certain acknowledged grievances suffered by Persian pilgrims at Mecca and elsewhere should be redressed by Turkey.

short sturdy men of an Azarbajian regiment, in butcher blue tunics of cotton, dirty white cross belts, and high Astrakhan caps. Persian geographers indeed actually look upon their own coast as part of Arabistán not of Irán, and therefore we will suppose all our arrangements made for a start into the interior, horses bought, servants hired, and a trusty muleteer engaged to convey our belongings to Shiraz. Carts there are none in Persia, though the country above the passes presents few difficulties to their use, and though, if Arrian is to be believed they were regularly used for carrying provisions to the court of Persepolis. On the other hand we need not trouble ourselves with tents, for though there is no paternal government to provide dák bungalows, private generosity has built caravanserais at most of the halting places, which will give a dry roosttree for men and beasts, if nothing else. Even if you choose an unfrequented route and caravanserais be scarce, we shall find that Persia is very different from India as regards the foreign traveller. No caste prejudices exist to damp the natural instincts of hospitality, and we have only to ride into a village and demand shelter to have a home of some sort cleared of its inhabitants by the "*Ketkhuda*," (the village mayor or "Lumberdar") and placed at our disposal for the night. But we must try and forget for a moment that we are the conquerors, of India and drop a little of that haughty manner which is, it must be confessed, necessary to the traveller who wishes to be respected in this country. Our servants will do all the minor swaggering, and though it does not do to be humble, indeed a fair amount of side, is advisable in Persia, we should be affable as becomes greatness, remembering that we are in a country, in which, despotic though it be in most ways, the right of free speech is specially cherished, and must submit to be questioned on every subject under the sun in the coolest manner. But if we be moderately polite and keep our tempers, we shall have no serious cause for complaint, and shall be rewarded by a freedom of discussion and openness of sentiment that will astonish us after the guarded reserve to which we have been accustomed among our dusky fellow subjects in India.

Here then we are on some fine morning in March, trotting through the single gate in the dilapidated ramparts of Bushire. For forty miles our road lies over a dead level plain, part of it a muddy swamp after springtides or heavy rain, but elsewhere interspersed with palm groves and cornfields. Villages are not infrequent, each with a small square mud fort, surrounded by palm leaf huts. The inhabitants are Persians, stalwart men, in tight long skirted dresses of blue cotton or English figured chintz, a brown felt Phrygian cap on the head, long love locks, and a whole arsenal of pistols and daggers in the shawl that girds the tightly pinched waist. For this coast land is a wild country, very unlike the peaceful interior; every village is as a rule at war with its neighbour, and blood feuds are carried out to the bitter end. Apropos of this I will tell you the story of an event that occurred at the little town of Borasjun, occupied by our troops for a couple of days during the war, and which we are now approaching. A young Syud, famous

for his wealth, good looks and courage, settled at a village not far from Borasjun and having a long standing but slumbering feud with it, fell in love with a girl of that place. He was warned of the danger of going near Borasjun, as it was the Borasjuni's turn to kill a man in prosecution of the blood feud ; but love laughs at locksmiths and every other obstacle, and the young Syud made several visits to his inamorata with impunity. One fine afternoon however he was riding into Borasjun with a single follower when a volley fired from behind some bushes, stretched him and the two horses dead on the ground, and broke his servant's thigh. The murderers escaped at once, and the wounded man would, according to the laws of honour prevalent in these parts, have been entitled to freedom from further molestation, but he determined on immediate vengeance. Dragging himself to his master's side, he possessed himself of his gun and pistols, which added to his own, made a formidable arsenal. A villager coming out to see the cause of the firing was immediately shot dead. A second met the same fate directly afterwards. By this time all the town was in arms and on the spot, and the avenger of his master and his tribe was speedily slain, but not before he had killed 5, and wounded 4 Borasjunes, thus leaving them a long way to the bad in the debit and credit account of slaughter. Not long before I left that part of the country, one of our telegraph lineguards at Bushire, dismissed for some misconduct, deliberately murdered his successor. The Persian Government takes no notice of these affairs. "If one dog kills another dog, what does it matter to you or me" a Persian official once remarked to me apropos of some murder. But though offences against the person are looked upon as venial, those against property are visited with the utmost severity. Murder in a private quarrel is left to the relatives to avenge, or let off with a fine ; but highway robbery or burglary even without violence, is punished by cruel death. But it becomes us not to throw stones. Traces of the same partiality are found in England, where the wife beater or the ruffian who knocks a man down and beats him till half dead is or was far more leniently treated than the pickpocket or the sheep stealer.

But we are loitering on our way. At Borasjún we are but five or six miles from the foot of the hills, which rise bare, but imposing, some five or six thousand feet above us. The ground now begins to be more, broken, and the traveller from India will especially remark the profusion of wild flowers that carpet it. Fragrant stocks, sheets of scarlet ranunculas, here and there the nodding pink bells of the Turkish flag, and among the corn, hollyhocks, red poppies and blue corn flowers will remind him of England. Soon we come to wells of black bitumen, the pitch with which Noah caulked the seams of the Ark, and his descendants cemented the bricks of the Tower of Babel.

A march of 55 miles occupying three days only (for a day's march in Persia where nobody except soldiers and muleteers walks, averages over 20 miles) brings us to the foot of the hills, which seen closely are less bare and desolate than they appeared at a distance. Patches

of bright green grass, a broom like wild almond, and a large heath, strangely resembling a gooseberry bush in full fruit, diversify their rugged surface. Stunted shrubs of *Acacia Arabica*, and *Lizyphus*, the *Babul* and *Ber* of India, grow in the hollows. The path leads through wild ravines cut by torrents through beds of variegated clays and marls seamed with veins of gypsum, and their strata of sandstone, abounding in fossils. Crossing a salt river by a high arched bridge, the way leads up what appears from below an almost perpendicular cliff some 1,500 feet high. This is one of the most notoriously bad passes in Persia, where bad passes are far from uncommon. The path is more like a flight of dilapidated stairs than a road, but the active Persian horses scramble up, and soon land us on the first of the terraces, descending from the highlands to the Sea, above which we are now standing some 2,000 feet. Immense date groves lie along the horizon, and around us are rich fields of corn interspersed with flowery meadows, from which the familiar cry of the black partridge is heard at intervals. These lower valleys are beautiful and pleasant in spring, but directly the corn is cut, every thing is burnt up and withered by the dry hot winds, and the country remains brown and bare till the next winter rains.

A second almost equally difficult pass leads to the valley of Kazrún, at the entrance to which, among thick jungle of myrtle and wild rose, lie the ruins of Shapúr, the capital of the Sassanian monarchs for 500 years. We are now 3,000 feet above the Sea, the gardens, though the date palm still towers above them, show vines, peach and apricot trees. But the glory of Kazrún is in its orange trees, which attain a size I have never seen elsewhere, and whose flowers attract the bees which served Tom Moore for a simile in the Veiled prophet of Khorassan. "Numerous as the bees of Kazeroon."

Above the town, which was nearly depopulated in the famine of 1870-72, towers a huge wall of red lime stone cliffs stretching far away to N. W. and S. E. Beyond it lies the plateau of Persia proper.

Skirting the base of these hills for a few miles we reach a reedy lake, on whose margin 10 or 15 couple of snipe may be picked up in a halt for breakfast. Round it are grazing herds of buffalos, rare animals in Persia. Their masters, the first nomads we have met, live in the low black tents yonder, and belong to a singular tribe, said to have emigrated from Mesopotania, and called by their neighbours, "Aráb Gao-mishis," buffalo Arabs. They are shiahs and wear the Persian dress but speak a corrupt dialect of Arabic.

Leaving the lake we ascend a rough rocky slope covered with bér bushes, to the foot of a steep ascent up which winds a paved road, a marvel of engineering in Persia. A stiff pull of 800 feet brings us to the top, where we emerge on a beautiful valley, covered with scattered

oak trees now just coming into leaf. Crossing the valley, we ascend a long steep pass by a stony road amid pretty thick forest of oak, wild almond, pear and other trees. This forest swams with wild pig, the prey of many lions, and is, by the way, the most easterly spot in Asia, with the exception of India, in which lions are found. There is thus a gap of nearly twenty degrees of longitude between the lion of India and his Kinsmen of Africa and western Asia, a gap to be accounted for by the absence of thick reeds or extensive jungle to give shelter to the monarch of beasts and his prey. There is no difference in appearance between the Persian and Indian lion, and their present separation by so wide an interval is one of the many facts pointing to the conclusion that western Asia was in comparatively recent times blessed with a far heavier rainfall than at present. Looking back from the summit of the pass, which is over 7,000 feet above the Sea, a wide view is spread before us. Range after range of hills, marking the edges of the several terraces we have crossed, stretch away to the horizon, and hide the Sea from us. All this country below the highest passes is called "Garmsir" or the warm region, the elevated plains of the plateau being termed in contradistinction "Sarhadd," the cold country. In fact to a Persian the whole world is divided into *Sarhadd* and *Garmsir*; or as the Turk speaking people of the north call it Yailák and Kishlák. His first question about a country is whether it is *Sarhadd* or *Garmsir*, and his beau ideal of existence is to spend his summer in the former and winter in the latter. In fact it would seem to him the most natural thing possible to pass six months of the year in Calcutta and six months in Simla.

Descending some thousand or twelve hundred feet from the summits of the pass we find ourselves in the little valley of "*Dasht-i-Arjan*," the vale of the wild almond. It was here that Sir John Malcolm's guide, pointing to the beautiful scene below, proudly exclaimed "*Iran Hamin Ast*," such is Persia. And, though the traveller who expects to find all Irán resemble this his first view of it, will be much disappointed, there many such nooks among its girdle of mountains that surprise by their unexpected beauty. A green expanse, over which herds of cattle wander knee-deep in rich grass yellow with buttercups; at one end a blue lake fed by a waterfall, dashing over a limestone cliff a thousand feet above, and ending in a cloud of spray; high hills all round covered with forest and vineyard; the bluest of skies and purest of atmospheres make up a scene which the traveller does not easily forget. At the further extremity of the valley is a grove of magnificent chenar and willow trees, watered by copious springs bubbling out of the rock. Ali son in law and nephew of the Prophet, revered by Persians as almost equal to him in sanctity, is said to have passed a night here, though sober history does not record his having visited Persia. However there are the foot prints of his horse to vouch for the fact, and what is more he is said to have been so pleased with the place, that he laid an injunction on the lions in the vicinity that they were never to wound a human being, unless in self

defence ; an order which their descendants are said punctually to observe to this day.

The other sight of Dashtiarjan is a cavern in the marble cliff above the spring, running parallel to its face. A hole some 15 to 18 inches in diameter piercing the thin partition of stone to the outside, about 5 feet from the floor of the cave. All sorts of good fortune is predicted to any one who successfully forces himself through this hole, and corresponding bad luck to those who fail in the attempt. It is not a very easy matter as you may suppose when I mention that I, who am rather the reverse of stout, had some difficulty in squeezing through. But the inhabitants say that fat or lean has nothing to do with success, as the hole can accomodate itself at will to the size of the person who essays the ordeal.

But we must linger no more at Dashtiarjan, whence a march of 30 miles through low rolling hills covered with brushwood, brings us to the plain of Shiráz, whose two turquoise blue domes we see shining some eight miles off.

All Persian towns are pretty much alike, so we will take Shiráz as a sample and devote a little time to exploring it. A half ruined rampart of *Kacka* bricks, with semicircular towers at intervals, surrounds the city ; entering which by one of the half dozen gates we find ourselves among narrow streets, hemmed in by mud walls, unpierced save by low doors. Let us enter one of these, and see if the interior of a Persian dwelling is as unpromising as its exterior. The door studded with huge nails and boasting an immense circular knocker, opens on a domed porch, with stone seats round its walls. From it we pass into a long dark passage, whence we emerge into a courtyard, fifty or sixty feet long and half that width. In the centre is a stone tank filled by subterranean pipes from the classic stream of Ruknábád. On each side are parterres shaded by orange trees, with perhaps a cypress or an oriental Plane towering above them. Below are rose bushes, interspersed with tulips, violets, narcissus and other flowers, but in no great variety. The rest of the court is paved with large square yellow tiles, and the whole is kept exquisitely neat and clean ; on the two sides are high walls of carefully dressed yellow bricks, set in various patterns. At the ends rise the dwelling rooms, raised some five feet from the ground on a plinth faced with huge slabs of polished limestone. Below are generally vaulted cellars called *Sardábs* or *Zirzamin*, used as storerooms or as day retreats from the summer heats. Above these cellars the centre apartment occupies the whole height of the house, which is flatroofed, the roof being terraced with mud, and used as a general sleeping apartment during the hot weather. The front of the main room is completely filled by a stained glass window, the lower half of which opens by sashes. At each side are a couple of low rooms one above the other, known as *Khavat*, or private places. The two ends of the court are sometimes similar, but oftener kitchens and outoffices fill the end opposite the dwelling rooms. The whole is known as the *birúni* or outer place, where the master of the house

receives visitors and transacts business. A covered passage leads from it to the *andarún*, or interior, which word, never *haram* as in Turkey, or *zanána* as in India, is used for the ladies quarters. The *andarún* is a repetition, though generally on a larger scale and more profusely decorated, of the *birúni*. There is no furniture in any of the rooms, but the floors are covered with the carpets for which Persia is famous, the most celebrated being those from the looms of Khurasán, Karmán, and Faraghán. The carpet only occupies the middle of the room. At the far end and along the sides are thick grey-brown felts, from Yazd answering to the divans of Turkey, and on these sit the master of the house and his guests according to rank, their knees carefully tucked under them and their hands concealed in the folds of their long cloaks. The ceiling should be noticed, elaborately painted with flowers, interpersed with portrait medallions, impossible looking Englishmen always in red coats, and Englishwomen in dresses almost lower than the present fashion, being favourite subjects. The walls are recessed, and the cornices moulded, painted and gilded in the honey comb style familiar to visitors to the Alhambra court of the Crystal Place. Mirrors are let into the walls, or sometimes large pictures in oil on canvass, often portraits, occasionally legendary or historic, such as the exploits of Rustam, or the pitiful stories of Yusuf and Zulaika, or of Khusrú and Shirin. Altogether the interior of the house, in spite of the absence of furniture will appear to us as rich and comfortable. Indeed on going to England after a good many years in Persia, I was much struck by the bareness and shabbiness of papered walls and white washed ceilings in comparatively good English houses. A Persian in determining to commit that stupendous act of folly, build a house, tempers it by fixing the sum he intends to spend, and dividing it into three equal parts; one third being allotted to the purchase of the ground, one-third to construction, and one third to decoration, a principle which if I remember rightly, would hardly be accepted as a canon by the department of Public works.

So much for the house. Let us pass to its inmates. Taking off the upper shoes or goloshes the use of which good manners render imperative to the European in Persia, but keeping on our caps or hats, we lift the purdah and pass into the reception room. Our host will rise to receive us, and will invite us to be seated on the upper felt or *sarrandáz*. He will then enquire after our health, trust that we are not ill, that our nose is fat; tell us that our place has been empty, and that his house is ours; and hope that our shadow may never grow less, or our kindness diminish. To all these compliments we must reply in kind. Gold, enamelled, or jewelled *Kaiians* will then be brought in, differing little in form from the Indian hookah, but greatly in reality; inasmuch as they are filled with the pure leaf of Shiraz, fragrant as Latakia or golden leaf, instead of the vile compound of treacle and spices to which our noses have been martyrs in India. Tea in Russian fashion that is weak and sweet, with slices of lemon or seville orange instead of milk, will then be brought in, with perhaps ices and fresh fruit in summer,

the inevitable *Kalian* coming between each course. We shall not get off under an hour at least, a short visit being the *ne plus ultra* of bad manners in Persia, but let us suppose that we have taken leave of our host under a cloud of compliments, and made our way into the street.

A few paces bring us to the great Bazar, called the *Bazar-i-Vakil*, after its builder Karim Khán Zand, the good sovereign who refused to take the title of Shah, contenting himself with the humble appellation of Vakil *i-e*. Lieutenant or Agent, and whose memory is still cherished with pride and veneration throughout southern Persia. The bazar is a street of shops, raised a few feet from the ground, and covered by a groined brick roof. It has the form of a Latin cross, and is 600 yards in length. The tenants of its shops are generally handicraftsmen or petty dealers, the richer having their warehouses in caravansarais leading out of it. It is always cool in summer and warm and dry in winter, and is therefore always thronged. But time is getting on, we must pass out of the town to visit the famous gardens and the tombs of Hafiz and Saadi, objects of veneration to Persians, almost equal to that inspired by their sainted Imáms.

A broad road, due like everything else in Shiraz to Karim Khan, takes us to the Hafiziah, a little cemetery in a garden, in the middle of which repose the ashes of the poet under an alabaster slab, engraved with odes from his own Díwán. The tomb of Saadi is similar, except that it is under a roof, and lies in a garden a mile away in a recess of the hills. The vaunted gardens of Persia are somewhat disappointing, being in truth little more than wildernesses of fruit trees, with straight walks fringed by Dutch poplars, cypresses or oriental plane. They are however, delicious refuges in the dry heat of summer, and a Persian is not far wrong in thinking a bottle of Shiráz wine, a good kálán, and pleasant companions by the side of a rippling stream in a garden of Shiraz or Isfahan, with the perfume of roses in the nostrils and the song of the nightingale in the ear, if not exactly Paradise, a very enjoyable way of spending a hot afternoon.

But we must bid adieu to Shiraz and its gardens, and hasten northwards, and this time we will travel post or chepar as it is called, availing ourselves of the horses laid out by government, in post houses about 20 miles apart, all along the main arteries of commerce. In this way we shall get over 40 to a hundred miles a day with tolerable comfort. A ride of 30 miles from Shiraz though barren and uninteresting hills brings us to the famous river of Bendamir, beyond whose stream lies the plain of Persepolis, which owes to it its fertility. There are no bowers of roses near the bridge where we cross the river, whose proper name by the way is the "Kur;" though there are plenty in the villages about, so we will go on to the famous ruins which however I will not stop to describe. A little beyond Persepolis we enter the valley of the Polvar a tributary of the Kur. This is a defile between lofty marble cliffs emerging some 70 miles from Shiraz on the plain of Pasargada, the capital of Cyrus, where stands his tomb of white

marble very much as it is described by the historian of Alexander's conquests. Hitherto the hills have been covered with pretty thick brushwood, the plains dotted with terebinth trees, and the scenery here and there both grand and beautiful. But we are now fairly on the plateau of Irán, and the country save in the neighbourhood of towns and villages presents for the six hundred miles before we reach the Caspian slopes, a dreary monotony of barren brown hill and dismal yellow plain. The latter is mostly gravelly desert not absolutely bare, and in spring indeed, covered with a green carpet of low shrubs and plants. But these soon wither up, and anything like grass is unknown. For months together in the winter, the whole landscape is shrouded in snow. The villages are simply oases and often very lovely ones, for this apparently barren soil needs but water to be abundantly fertile.

Three hundred miles from Shiraz we reach Isfahan, the capital of the Sufi monarchy, once a magnificent city of half a million inhabitants, but now sadly out at elbows. The Isfahani is notorious among Persians for his fair skin and deceitful tongue, for his cowardice and bigotry, also for his marvellous taste in art. Though one of the most rainless districts of Persia (it is said that a naked sword may be left on the roof of a house for 10 months of the year without fear of its being rusted) Isfahan is one of the most fertile, owing its agricultural wealth to the river Laindarúd, the canals from which are well worth inspection, more especially as they are managed without any Irrigation Department.

Three stages after leaving Isfahan, we cross the great, but nameless range of mountains, which divides Central and Southern Persia into nearly equal halves. The pass by which we traverse it, is 9,000 feet above the sea, and a thousand feet below lies the alpine village of Kohrúd, nestled in gardens among precipitous rocks, a charming spot after the barren hills and deserts among which our road has lain from Isfahan.

We now descend to the edge of the great salt desert, on the borders of which lie the cities of Kashán, celebrated for its silk manufactures and metal work, and Kom, famous for the shrine of Fatima, Sister of Imam Reza, and second only to Mashad as an efficacious place of pilgrimage. Beyond Kom we cross 80 miles of dismal wilderness, part of it Kavir, and part a succession of fantastic and dreary ravines, the fabled abode of Jinns Afrits and ghouls, and called by Persians the "valley of the angel of death." This, the most disagreeable part of our ride over, we reach Tehran, the modern capital, lying in a plain at the foot of the Elburz mountains. It would detain you too long were I to describe the city of the Kajars and its doings, so we will hurry onward. One hundred miles from Tehran, the road lying over a plain partly desert but dotted with rich villages, lies Kasvín, once like most large cities in Persia the capital, now only famous for its wine. We then cross the Elburz by a pass between 6 or 7 thousand feet above the sea, and descend into Gilán where we seem to have been transported into

another region of the earth. Every thing is as damp and green as it was dry and bare on the plateau. The road skirts a wide Salmon river or crosses rich woods. Above, the mountains are clad with thick and varied forest. I will not try to describe the beauties of the Gilán to you, but may say that the valley of Dolgelly in north Wales, multiplied by three would give a fair idea of that of the Safid rúd. The sport in these Caspian forests is excellent. Tigers, bears, and Leopards abound, but are not easily got at. Maral, the great red deer of western Asia, almost exactly similar to the Cashmere stag, and roedeer are common on the lower ground, ibex and wild sheep on the higher hills. This is the native home of the common pheasant, and wood cock swarm in the winter. Wildfowl of every sort from swans to snipe visit the shores in countless numbers, when driven southwards by the setting in of the ice to the north.

So ends our journey on Persian soil, embarking at Anzali, the port of Resht, six days on the Russian steamer will land us at Astrakhan, the morrow will find us at Tsaritsin on the Volga, the south-easterly terminus of the Russian railway system, whence six days continuous travelling will deposit us at Charing cross.

I was asked to give a lecture on the Physical Geography of Persia only, but I find that some details about its inhabitants and their ways are expected, and I have therefore somewhat hurried over the geography to give time for a few words on these subjects.

The number of the inhabitants of the modern kingdom of Persia has been much disputed, earlier authorities putting it down at 10 millions, that is to say about 16 to the square mile, and Mr. Arnold the author of the last book on Persia, who as I said before takes a very pessimist view of matters from a very cursory inspection, sets it down at $2\frac{1}{2}$ millions or 4 to the mile. Mr Ronald Thomson, secretary of Legation at Tehran, who has been 30 years in the country estimated the number at $4\frac{1}{2}$ millions before the famine, basing his calculation on revenue returns. Now the fallacious results given by these are notorious. In Bengal the population judging by the revenue returns was set down at 40 millions, but the census showed that it contained 67 millions, the error equalling the population of Great Britain. Considering the vast extent of the country, and that much of it is apparently as closely cultivated as most parts of India, considering moreover that it is to the advantage of, not only every official but every man in the country except the Shah to conceal the truth, I think it unsafe to estimate the population at less than eight millions, or about 13 to the square mile.

Of this 8 millions, perhaps 5 are Persian that is Aryans either pure or with a moderate admixture of foreign blood, Semitic or Turanian,—half a million Arabs, and the remaining $2\frac{1}{2}$ million Turks, not Osmanli Turks, but Turanians of the Túrk, as opposed to the Mongol branch,

which is only represented in Persia by a few Turkmans on the North East frontier. But the broad distinction in Persia is between Turk and Tajck, that is between those who are Turks and those who are not, and between the two races is constant antagonism, in which the Turks have in every way the better of it, at least as far as government goes. Intellectually of course it is all the other way. We will recur to this antagonism further on.

Another broad distinction and one better marked to the superficial observer is that of nomads, and people settled in one place—*Chadar-nishin* and *Shahr-nishin*, tent dwellers and house dwellers. At a rough guess the former are three-eighths of the whole population. They are generally known as *Ilyat*, and their business is to supply meat, wool, hides and ghee to the town population. They are also in some parts great horsebreeders, and are the principal manufacturers of the carpets for which Persia is celebrated. They live in black tents of goats hair, and spend their winters in the plains and lower valleys, migrating to the hills in the hot weather. Hospitality is with Ilyats a sacred duty. I remember once spending a few days with the Chief of the Kashkai Ilyats in Fars. Not content with entertaining me, my servants, and horses, he insisted on providing food and forage for my hired muleteers and their beasts. They are a very pleasant jovial people, though it must be confessed arrant thieves. The Ilyat tribes as might be expected from their numbers and warlike disposition have played a very prominent part in the history of Persia. The seven Kazilbash tribes, Túrks, placed the Safari dynasty on the throne, and in token thereof were granted the exclusive privilege of wearing a red cloth cap encircled with sheep's skin, whence the name Kazilbash, red head, by which the so called Persian, but really Túrk colony, at Kabul, is still known—Nadir Sháh who expelled the Afghans from Persia and invaded India was a Kazilbash of the Afshar tribe. His successor Karim Khan, the good Vakil, was chief of the Zands a nomad Aryan tribe of Fars; and the present dynasty are Kajars, like the Afshars, a Kazilbash or Túrk tribe. Now from this government by Turks spring half the evils from which Persia is suffering. Túrks have many admirable qualities. They are the bravest and honestest race in Asia, fairly temperate, though not so much so as Persians proper, and far more hospitable, but partly from inveterate pride of race, and partly from avarice they are the worst Governors of subject races in the world, looking upon every other being as created for their sole use and benefit. The early Túrk sovereigns of India, Persia and Byzantium recognised this defect in themselves, and used natives of the countries they conquered in all public offices except the army. But the conquering race came in time to claim its share of the good things of patronage, and then came the inevitable crash. The very peculiar domestic institutions of the Osmanli Turks, among whom until late years Christian slaves, forcibly converted to Islam, occupied nearly every public office of importance, have postponed their fall for many years. But no Túrk dynasty has been able to hold its own for long in Persia, and the present royal tribe unless supported from without, will sooner or later

be ruined by its own shortsighted avarice and imbecility. The only two contented and prosperous provinces of Persia are Azarbaján, where rulers and people are alike Túrks, and Karman, which though the Governor is of a Turkish tribe, is not interfered with by the central Government at Tehrán. One cannot but sympathise in the gallant defence Túrkey is making against the immense forces of a neighbour who is hardly if at all better than herself, but at the same time I believe that the sooner Túrks are relieved of the responsibility of governing other races, whether Christian or Musalmau, the better for them and for humanity. The character of Persians proper has been very variously estimated. No abuse has been too virulent for them in the opinion of some, generally I have noticed philo-Turks; while others including most who have gone to Persia from India look upon them as not only the most civilized of orientals, but the most capable of advanced civilization. Their mendacity is undeniable, but differs only from that to which we are unfortunately habituated in India, in being cleverer, more unfathomable as it has been expressed. Their morality is bad, but not worse than that of Turks, and better than that of Arabs. The only difference is that they take less trouble to conceal their misbehaviour, not from callousness, but from sheer loquacity and lightness of heart. In fact, like Frenchmen, to whom they are sometimes compared, they often avow misdeeds of which they are really perfectly innocent. The great charm of the Persian character to Anglo Indians especially, is their freedom from oriental reserve, the open way in which they will talk about any thing and every thing. Two years in Persia teach one more about orientals than twenty in India.

Underneath the apparent frivolity of Persian character there must be an immense amount of vitality in the race, and this is what gives me hopes that Persia may yet be regenerated. Remember that her's is the oldest monarchy in the world. Repeated waves of conquest Arab and Turanian have swept over her head, but after each she has come up smiling, and quietly absorbed and made Persians of her conquerors, imposing laws, language, and broad outline of character on them. Take the parallel case of England. Saxons, Danes and Normans between them have nearly obliterated the Celts, but Arabs, Turks, and Mongols have left Persia comparatively unchanged. Imagine England speaking Celtic with a large infusion of Saxon and Norman words, but still Celtic and glorying in the name, with many traces of Druidical worship and superstitions in her religion and observances, and you will be able to form an idea of Persia's present position with reference to her past.

The best thing that could happen to Persia, whether it might be to us, would be for her territories and ours to touch each other. As it is, she is bordered by peoples less civilized than herself, except in some externals; and any attempt at material improvement by either of the two powers interested in her, England and Russia is sure to be thwarted by the other.

The religion of Persia, is I need hardly tell you, almost universally Shiah Muhamadanism and this separation from the rest of Islam forms a great bond of union in the country. Though originally caused perhaps by race distinction, the aryan not being content with a simple and colourless creed like that of orthodox Sunnism, it was established as a political move by the first Safari Shah to weld together the various races in the land, and was no doubt a very wise stroke of policy. Other religions count but few followers, Persia being the most exclusively Muhamadan nation in Asia. The Armenian Christians, a branch practically of the Russo-Greek church number perhaps 100,000 souls, all devoted slaves of Russia. Fireworshippers, or Gabars as they are called in the country, are much fewer in number than is generally supposed, not exceeding probably 5000, mostly living in the neighbourhood of Yazd, and, strange contrast to their brethren in India, celebrated for their skill in agriculture, to which they almost entirely devote themselves. Small colonies of Jews are found in all the larger towns, and there are a few Hindoos, bunnias from Shikarpúr, in the cities of Mashad, Yazd, and Karmán.

The mode of life in Persia is far more in accordance with our western ideas than that we find among the higher classes in this country. For good breeding and politeness they are noted, and their habits of privacy are quite in consonance with our ideas. I was lately visiting one of the high native potentates of India, and found him playing billiards with his courtiers, in a room filled to suffocation with nautch girls and menial servants of every degree, a spectacle as disgusting and barbarous to Persian ideas as to our own.

Meal times in Persia are not dissimilar to our own, though somewhat later, noon being the regular hour for breakfast, the first meal a cup of tea and a piece of bread only, being taken on rising. Dinner is late, rarely before ten, and should perhaps rather be called supper; but five o'clock tea is a thoroughly Persian institution. The cuisine is greasy, and the mixture of sweets and acids disagreeable to most European palates. But mutton kabobs are excellent and a lamb roasted whole and stufted with pistachio nuts and raisins merits all that is said in its praise in the Arabian nights.

As far as regards the seclusion of women, Persians occupy a middle position, being stricter than Turks or Arabs, but not so strict as Indians. Absolute seclusion within four walls is unknown, ladies exchange visits go to the public baths, and have teaparties and picnics in gardens. The lower classes go about freely; but no Mussulman woman in a town is allowed to uncover her face when abroad. All must be strictly veiled. Even the Ilyat ladies, who go unveiled when among their tents, cover their faces in the towns. Male visitors, except again among the Ilyats, are as a rule absolutely prohibited, though the prohibition was, I found, occasionally relaxed in favour of married Feringis. From the subject of ladies the transition to that of dress is natural. Fashion

in Persia, unlike Asiatic countries in general, has a tendency to change almost equal to that we see in western Europe, and this tendency is of very ancient date. Herodotus tells us that after Persians and Medes were united under one sovereign, the Persians thinking the Median dress preferable to their own lost no time in adopting it. Persian men are rapidly taking to a semi-European costume, and the ladies whose costume, if pictures are to be believed, was half a century ago something like that worn in some parts of India, long trowsers gathering in tight folds about the ankles, now leave those beauties entirely exposed, and wear a multiplicity of petticoats voluminous as the skirts of a ballet dancer. It is this capacity for change, noticeable in art as in dress, which makes it difficult to believe that the vitality of the nation is at so low an ebb as some writers would have us think.

In conclusion I will say a few words about the Persian army. With the exception of a small body of artillery, and the Shah's personal cavalry guard, there is really no regular army. The infantry which numbers perhaps 70 to 80 thousand men, is in reality militia. The regiments are known by the names of the districts or tribes from which they are recruited, all officers except the higher grades belong to the tribe or district, and after 4 or 5 years embodiment the whole regiment is dismissed on 2 years furlough. The men are wretchedly dressed and equipped, and until lately were mostly armed with flint lock muskets. All have now I believe percussion arms, and a few, rifled breechloaders. The officers of all grades have no theoretical and little practical instruction. A few old fashioned parade movements make up the only drill. The artillery is better. The field guns are of brass cast at the arsenal in Tehran and rifled on the French system, firing lead coated projectiles. The carriages and fittings are clumsy, and the batteries insufficiently horsed, not attempting to manœuvre. Regular cavalry there is none, with the exception of the Shah's guard, but its place is not badly supplied by the Ilyat horsemen, who are however though splendid riders, more mounted infantry than cavalry. A very little drill, good arms, and English leaders would make them magnificent dragoons. Altogether the Persian soldier could do very little in the open against Turks or Russians, though he would make a gallant stand in his own mountains. But the materiel is admirable. A fine physique, marvellous marching powers, perfect temperance, and extraordinary power of resisting extremes of temperature, form a foundation on which to build the superstructure of a splendid army. The English officers who drilled the Persian army at the beginning of the century had a high opinion of their men, which seems to have been reciprocated, for the memory of Sheil, Farrant, and above all Lindsay is still cherished. For the latter, an officer of the Madras artillery, Persians had the highest respect and love, and he was at one time Commander in Chief of the Persian army. To Colonel Farrant, the heir apparent Abbas Mirza entrusted the military education of his sons, uncles of the present Shah, and they are without exception the best men in the country. One of them, the Hisam-es-Sultaneh, now commanding the army of observation on the

Turkish frontier, told me that one day when he and his brothers were late for parade, Colonel Farrant threatened to give them extra drill or arrest or some such punishment. They complained to their mother who entreated the prince to have the Englishman chastised for his insolence. But the only satisfaction the irate lady got, was being told to recommend her sons to obey orders, for if Colonel Farrant had promised to punish them she might be certain he would do as he promised.

Postscript.—Some disappointment was, I have reason to believe expressed that I did not touch on politics in the foregoing lecture. I omitted to do so, first, because it seemed to me that a disquisition on politics would have been out of place in a lecture in a scientific institution, and secondly, the subject would have opened up so wide a field as to make it impossible to do it anything like justice at the fag end of a discourse on physical geography. The value of Persia as a factor in modern politics, involving as it must, a retrospect of her history for the last century, might well afford subject matter for a lecture in itself.

O. B. ST. JOHN,

Major R. E.

III.

THE ARMAMENT OF CAVALRY,

BY LIEUT. G. H. ELLIOT,

Adjutant, 3rd Bengal Cavalry.

“Lateat scintillula forsan.”

Il est essentiel d'en arriver là, car un corps indépendant de cavalerie, ou une masse couvrante, ne remplit complètement sa mission que s'il se compose de sabres, de lances et de carabines intelligemment groupés. (La Cavalerie et armement depuis la guerre de 1870, par Le Baron A. Lahure. Capitaine d'Etat-Major.)

Superiority of armament increases the chances of victory in war ; it does not of itself gain battles, but it is a great element of success.—*Jomini.*

VIRGIL commences the prelude of his great epic poem, the *Aeneid*, by telling us that the burden of his song is “Arms and the man,” and in a similar way we may with propriety select the quotation *Arma virumque cano* as a text for the subject which we are now about to inquire into. Strictly speaking, neither the subject nor the quotation can lay claim to any of the charms of novelty, for since the period when Xenophon, the great Attic General, wrote his famous treatise on Cavalry,* down to our own era, there have always existed writers who, with more or less success, according to their knowledge and abilities, have descanted on the armament and equipment of soldiers ; but notwithstanding that the topic may, perhaps, be said to have been worn somewhat threadbare, it still remains to this day in all respects as interesting to the military student as ever. The art of war being always progressive and never stationary, the question as to the proper armament of men trained to fight must of necessity be difficult to consider, and impractical to finally decide upon ; for according as “the old order changeth, yielding place to the new,” so we find that, owing to the almost daily introduction of scientific inventions and improvements having reference to the military art, the armament of soldiers is constantly changing in its details, if not in its general principles, and in all human probability will continue to do so until the arrival of the millennium, the Greek Kalends, or some such Utopian period, compels all warriors to forego their profession, and benefit mankind by converting their swords into ploughshares, or other Bœotian instruments of toil. At present, however, there seems no possibility of this happy state of affairs being brought about, at all events during the lifetime of the present generation ; hence we may still continue, with advantage, to theorize and speculate upon any moot points which may arise from time to time.

* Hipparchicus, or the Duties of a Commander of Cavalry, the earliest known treatise on horsemanship, with the exception of that written by Simo, the Athenian, quoted by Pliny.

receives visitors and transacts business. A covered passage leads from it to the *andarún*, or interior, which word, never *haram* as in Turkey, or *zandána* as in India, is used for the ladies quarters. The *andarún* is a repetition, though generally on a larger scale and more profusely decorated, of the *birúni*. There is no furniture in any of the rooms, but the floors are covered with the carpets for which Persia is famous, the most celebrated being those from the looms of Khurasán, Karmán, and Faraghán. The carpet only occupies the middle of the room. At the far end and along the sides are thick grey-brown felts, from Yázd answering to the divans of Turkey, and on these sit the master of the house and his guests according to rank, their knees carefully tucked under them and their hands concealed in the folds of their long cloaks. The ceiling should be noticed, elaborately painted with flowers, interpersed with portrait medallions, impossible looking Englishmen always in red coats, and Englishwomen in dresses almost lower than the present fashion, being favourite subjects. The walls are recessed, and the cornices moulded, painted and gilded in the honey comb style familiar to visitors to the Alhambra court of the Crystal Place. Mirrors are let into the walls, or sometimes large pictures in oil on canvass, often portraits, occasionally legendary or historic, such as the exploits of Rustam, or the pitiful stories of Yusuf and Zulaika, or of Khusrú and Shirin. Altogether the interior of the house, in spite of the absence of furniture will appear to us as rich and comfortable. Indeed on going to England after a good many years in Persia, I was much struck by the bareness and shabbiness of papered walls and white washed ceilings in comparatively good English houses. A Persian in determining to commit that stupendous act of folly, build a house, tempers it by fixing the sum he intends to spend, and dividing it into three equal parts; one third being allotted to the purchase of the ground, one-third to construction, and one third to decoration, a principle which if I remember rightly, would hardly be accepted as a canon by the department of Public works.

So much for the house. Let us pass to its inmates. Taking off the upper shoes or goloshes the use of which good manners render imperative to the European in Persia, but keeping on our caps or hats, we lift the purdah and pass into the reception room. Our host will rise to receive us, and will invite us to be seated on the upper felt or *sar-andáz*. He will then enquire after our health, trust that we are not ill, that our nose is fat; tell us that our place has been empty, and that his house is ours; and hope that our shadow may never grow less, or our kindness diminish. To all these compliments we must reply in kind. Gold, enamelled, or jewelled *Kalians* will then be brought in, differing little in form from the Indian hookah, but greatly in reality; inasmuch as they are filled with the pure leaf of Shiraz, fragrant as Latakia or golden leaf, instead of the vile compound of treacle and spices to which our noses have been martyrs in India. Tea in Russian fashion that is weak and sweet, with slices of lemon or seville orange instead of milk, will then be brought in, with perhaps ices and fresh fruit in summer,

the inevitable *Kalian* coming between each course. We shall not get off under an hour at least, a short visit being the *ne plus ultra* of bad manners in Persia, but let us suppose that we have taken leave of our host under a cloud of compliments, and made our way into the street.

A few paces bring us to the great Bazar, called the *Bazar-i-Vakil*, after its builder Karim Khán Zand, the good sovereign who refused to take the title of Shah, contenting himself with the humble appellation of *Vakil i-e.* Lieutenant or Agent, and whose memory is still cherished with pride and veneration throughout southern Persia. The bazar is a street of shops, raised a few feet from the ground, and covered by a groined brick roof. It has the form of a Latin cross, and is 600 yards in length. The tenants of its shops are generally handicraftsmen or petty dealers, the richer having their warehouses in caravansarais leading out of it. It is always cool in summer and warm and dry in winter, and is therefore always thronged. But time is getting on, we must pass out of the town to visit the famous gardens and the tombs of Hafiz and Saadi, objects of veneration to Persians, almost equal to that inspired by their sainted Imáms.

A broad road, due like everything else in Shiraz to Karim Khan, takes us to the Hafiziah, a little cemetery in a garden, in the middle of which repose the ashes of the poet under an alabaster slab, engraved with odes from his own *Dlwán*. The tomb of Saadi is similar, except that it is under a roof, and lies in a garden a mile away in a recess of the hills. The vaunted gardens of Persia are somewhat disappointing, being in truth little more than wildernesses of fruit trees, with straight walks fringed by Dutch poplars, cypresses or oriental plane. They are however, delicious refuges in the dry heat of summer, and a Persian is not far wrong in thinking a bottle of Shiráz wine, a good *kalián*, and pleasant companions by the side of a rippling stream in a garden of Shiraz or Isfahan, with the perfume of roses in the nostrils and the song of the nightingale in the ear, if not exactly Paradise, a very enjoyable way of spending a hot afternoon.

But we must bid adieu to Shiraz and its gardens, and hasten northwards, and this time we will travel post or chepar as it is called, availing ourselves of the horses laid out by government, in post houses about 20 miles apart, all along the main arteries of commerce. In this way we shall get over 40 to a hundred miles a day with tolerable comfort. A ride of 30 miles from Shiraz though barren and uninteresting hills brings us to the famous river of Bendaur, beyond whose stream lies the plain of Persepolis, which owes to it its fertility. There are no bowers of roses near the bridge where we cross the river, whose proper name by the way is the "Kur;" though there are plenty in the villages about, so we will go on to the famous ruins which however I will not stop to describe. A little beyond Persepolis we enter the valley of the Polvar a tributary of the Kur. This is a defile between lofty marble cliffs emerging some 70 miles from Shiraz on the plain of Pasargada, the capital of Cyrus, where stands his tomb of white

Now, amongst the problems that have lately occupied military minds, more especially on the Continent, is the very important one of the Armament of Cavalry ; and, as is usual in all such purely technical questions, great diversity of opinion exists ; some authorities holding that the carbine and sword are the proper weapons for a trooper, while others say that as horse-soldiers are out of place dismounted, and because they cannot use their carbines with any effect when mounted, they should receive revolvers* instead of carbines, the pistol being more useful when mounted and in a *mélée*, &c. Others, again, put their trust in the lance, sword, and pistol ; whilst a few think that cavalry should solely be armed with *les armes-blanches* : on the other hand, American cavalry officers hold that a repeating rifle is *the* weapon for light horsemen. One of our best authorities on the subject considers that "the true arm of the horseman is his horse;" whilst another says—"I am aware that the success of cavalry depends more upon the ability and courage of the men than on the shape of their swords or the speed of their horses." Colonel Dension, in his work on "Modern Cavalry," assumes that the value of cavalry depends upon the quality and condition of their horses. Some, again, have taken it for granted that its usefulness depends more upon moral than upon physical causes,† apparently agreeing with the great Seidlitz, who one day was present at a sort of council of war, during which the armament of cavalry was the subject discussed. Tired out by the interminable speeches he was compelled to listen to, he abruptly closed the debate as follows:—"Give the horseman a lance, a stake, a sabre, or a horsewhip, if matters little. What is wanted above all things is that he be well-mounted, and completely inspired with the firm resolution to upset the enemy with the breast of his charger." By no means a bad argument in itself, but in these days of breech-loading rifles and Gatling guns, something more is required to prevent cavalry from falling into the sear and yellow leaf. General Warnery writes his views thus:—"The strength of cavalry consists in the rapidity of its movements, in the violence of its charge, and in the good order in which these manœuvres are performed." Xenophon in his work,‡ when treating of the duties pertaining to a cavalry commander, dwells upon the necessity of attending to the horse's feet above all things. And, finally, one of our best authorities on "Horses and Hunting" believes that the virtues of a dragoon are situated in his heels, for he says—"How should the light horseman be armed ? The first and most important arms for a cavalry soldier are his sword and spurs,§ the latter to make the former available."

* The earliest model of the revolver is to be found in the museum of the United Service Institution, and is supposed to date from the reign of Charles I.

+ L'effet moral est pour les trois quarts dans la puissance de la Cavalerie (General De Brack.)

‡ Hipparchicus.

§ Good spurs add a fourth to the skill of the rider, and a third to the vigour of the horse. (Arab maxim.) The battles of Courtrai and Guinegate are both known as "the battle of spurs," because the French knights used their spurs more than they did their swords. The former took place in 1302, and the latter in 1513.

Who shall decide when sages disagree ? Many men have many minds ; but all this tends to show the great difference of opinion that is now, and has been, held by those who have reflected on the subject, and at the same time also fully accounts for the manifold systems of armament that are in existence amongst the cavalry services of military nations.

Taking all these circumstances into consideration, we will endeavour to give both sufficient and weighty reasons to prove that none of the above-mentioned methods of arming mounted soldiers can be finally and absolutely recommended as the best and most suitable for Light Cavalry under all the numerous and diversified conditions of war which occur at every phase of a campaign. On the other hand, keeping in mind that cavalry should be arranged and distributed so that it may act more or less in every kind of ground, it is intended to set forth the advantages of arming the front rank of Light Cavalry Regiments with the lance, sword, and revolver, and the rear rank with the sword and carbine,—a system which, it will be remembered, is not by any means new or untried, as it has long been in use with the Russian Dragoons as well as with a few Native Cavalry Regiments of our own service in India. Moreover, we may observe that the Prussians, Austrians, and Italians have, to a great extent, since the Franco-Prussian war, adopted this plan of armament for their Uhlans, and, if rumour be correct, the Bombay Cavalry are about to follow their example, the late Commander-in-Chief of that Presidency having issued orders that the experiment was to receive a trial. It will therefore be seen that we have no intention of recommending to notice any premature crude ideas, or of bringing forward any pet plans or theories of our own ; on the contrary, far from it, it is the extension of an old, and not the introduction of a new system that we wish to advocate.* Before proceeding, however, any further with the inquiry, it will be as well to investigate the history

* If the armament proposed ever finds favor, there is probably no service in the world in which it could be more easily introduced, or with greater hope of the results being successful, than the Bengal Cavalry. The reason being that a large proportion of the men, from constantly practising tent-pegging, are already skilled in the use of the lance. Nearly all regiments, if not quite all, indeed, have a number of men who, from natural inclination, prefer the lance as a weapon to the sword, and devote much time to its practice. As an instance of this, we may mention that his Excellency the Commander-in-Chief's prizes, both at the Camp of Exercise, Delhi, and Hussun Abdal, and another at the Assault of Arms at Lucknow, some few years ago, were won by men who did not belong to Lancer regiments. Again, there are some regiments, who, although not lancers, can, as regards tent-pegging, fairly lay claim to be considered quite first class. This is most creditable to all concerned, but there is the temptation to say, *Cui bono?* It certainly seems an anomaly that in time of peace a number of men are encouraged in every way to become proficient with the lance, and yet if ordered on service they would have to fight with the sword. Under these circumstances it seems to be a waste of time for regiments not armed with the lance to practise tent-pegging. Moreover, a man accustomed to wield the lance, and knowing its powers, would have a not unreasonable dread of it, when held, not in his hands, but in those of an enemy. Whether it is wise to produce or encourage this feeling, is a matter worthy of attention. These last assumptions may be objected to, and perhaps with justice, as being the views of an utilitarian ; but then war is the harvest of peace ; and sowing and reaping are processes intimately connected. The remarks made are however simply offered for consideration, and not as part of a captious or censorious argument.

of this mode of arming cavalry, for previous records often enable us to judge rightly of the merits or demerits of any vexed question we may be desirous of solving.

"There is nothing new under the sun" is a time-honored, but yet very true aphorism ; for, on referring to Carlyle's *Cromwell*, we find that, as far back as the Battle of Dunbar, fought in A. D. 1650, during the civil war in England, the front rank of the Royalist Horse were armed with the lance. Oliver Cromwell, in a letter to a friend, describing the battle, says as follows :—" But here, on the right, their horses, with lancers in the front rank, charge desperately, and drive us back across the hollow of the rivulet." Apparently, however, this custom was not in general use, at all events with the cavalry of other nations, as we have no further definite information regarding its adoption until Marshal Marmont, during his exile in Russia, persuaded the Russian Dragoons to revive the system. By an order of the day, dated 30th March 1828, the Emperor of Russia gave the lance to the front rank of all cavalry regiments about to take part in the campaign against the Turks ; and the experiment stood the test of service and succeeded in actual warfare so well, that this example was speedily followed by many others, and henceforward we continually find the lance in the front rank, and a greater or less proportion of carbines, according to nationality and circumstances, in the rear rank. Marshal Marmont's reasons for recommending this armament may be summed up in a few words.

The lance *la reine des armes blanches*, as Saxe and Montecuculi entitle it, although beyond all doubt the most effective weapon, on nearly all occasions, that can be placed in the hands of a skilful cavalry soldier, yet has some obvious disadvantages connected with its employment, which can only be removed by supplementing with it the sword and carbine. The converse of this principle being also true, as will hereafter be shown, it follows that we must use these weapons conjointly and not separately, in order to retain the peculiar advantages of each while at the same time remedying their disadvantages. This enunciation is neither based on mere theory, nor founded on plausible hypothesis ; quite the contrary, the history of warfare most clearly and unmistakeably proves that the lance is out of place, and becomes comparatively harmless, when the sword and carbine are not brought to its aid ; and, *vice versa*, there are many occasions when the sword and carbine must give way, if the lance be not ready at hand to give and take the first shock of a hostile charge. To recapitulate this proposition : as the lance, sword, carbine, and pistol have each and all many inherent defects, it is thought that by using them in support of each other, and not in disjunction, their imperfections may be mitigated, if not entirely removed. In union lies strength.*

* In the proceedings of the United Service Institution of India, August 1874, will be found a very interesting paper, translated from the German by Major Warren in which an officer of Uhlaus gives his reasons for deciding that either a partial or thorough combination of the lance and carbine is not only desirable, but absolutely necessary under the conditions of modern warfare. Boguslawski also notes this in his *Tactical Deductions*.

Many other distinguished authorities and celebrated military writers besides Marmont fully recognise the truth of the above-stated facts. For instance, Von Bismarck, in his *Use and Application of Cavalry in War*, advocates most strongly the system of front rank lance and rear rank sword. Trower, in a work entitled *Hints on Irregular Cavalry*, says as follows :—" Of all weapons in the hands of a good native horseman, even superior to the sabre, the native lance of light, but tough bamboo, about nine feet long, is the best. It is more especially useful in difficult country or in brushwood. There should be in every regiment of Irregular Cavalry fifty lancers to ten carbineers." Furthermore, Shakespear, Chamberlain, Christie Tait, Beamish, Meade, and several other famous officers of Irregular Cavalry, have given much the same advice as Captain Trower. Their opinions on the subject of the armament and equipment of troopers may be found collected in a work published anonymously about 1864, called, *Our Native Cavalry*. As a matter of curiosity, we may mention that Machiavelli,* writing in A. D. 1521, recommended that the front rank of infantry should be armed with the pike for repulsing cavalry, and those in the rear rank with the sword, as being a weapon better adapted for every other purpose.

We now purpose considering the views of General Jomini, who, in his standard work, *l'Art de la Guerre*, when treating of the best method of arming cavalry, says as follows :—" In charges in line the lance is very useful ; in *mélées* the sabre is much better : hence comes the idea of giving the lance to the front rank, which makes the first onslaught, and the sabre to the second rank, which finishes the encounter usually in individual combats. The lance is the best arm for offensive purposes when a body of horsemen charge in line, for it enables them to strike an enemy who cannot reach them, but it is a very good plan to have a second rank as a reserve armed with sabres, which are more easily handled than the lance in hand-to-hand fighting, when the ranks become broken." Nothing can be more explicit or distinct than these words of Jomini ; and when we reflect that he is admitted by all competent judges to be one of the ablest, if not the ablest military critic and historian that has ever lived, then it will be readily imagined that further comment or criticism on our part could neither be useful nor profitable.

Before closing this brief account of the origin of arming mounted soldiers both with the lance and sword, we will extract from Marshal Marmont's valuable work, *Esprit des Institutions Militaires*, his ideas on the subject :—" It would be better for cavalry to have both the lance and the straight sabre. The first rank would charge with the lance in rest, the second sabre in hand. When once the shock has been given and the ranks mixed, the sabres of the second rank will do their work. The lance has also the superiority in combats of one body of cavalry against another, if opposed to an enemy armed only with

* *Arte della guerra di Machiavelli.*

sabres. It is a splendid weapon when the hostile troops come into contact. It is also useful in the pursuit of the flying enemy. To sum up. I am authorized in saying that, for cavalry of the line, the lance should be the principal weapon, and the sabre an auxiliary arm."

Having thus laid before the reader a statement of the theory on which this system of arming cavalry is based, we purpose, before proceeding any further with our theme, giving a few instances, selected from the history of warfare, showing where cavalry equipped with this armament have been tried on service, and the results which took place. In short, we must examine if the theory, so carefully elaborated during time of peace, succeeded or not, when the only true test of its value was applied, *viz.*, employment on the field of battle. Again, quoting Marshal Marmont :—"I shall relate a fact bearing out my views with regard to the mode of employing the lance, and obtaining great results from it. In 1813, at the battle of Dresden, on the left of the Austrian army, our cuirassiers had made several charges against the infantry which had been abandoned by their cavalry. The infantry always resisted and repulsed our attacks, although the rain prevented almost all their muskets, being fired. This resistance could not be overcome until fifty lancers, which formed the escort of General Lautour-Maubourg, were placed in front of the cuirassiers ; the lancers made a breach through which the cuirassiers were able to penetrate and destroy the enemy." This incident is a very valuable illustration of the application of the theory in war, and, being complete in all its details, further comment on our part is unnecessary. It speaks for itself.*

An example can now be given to show where the want of swordsmen to follow lancers and render them due assistance (which, although one of the most gallant actions ever fought by British cavalry, and perfectly successful) led to results disastrous to the victors, and very different from the incident just placed before us by Marmont. During the Sutlej campaign, at the Battle of Aliwal, the 16th Lancers, in a most determined manner, broke into the Sikh squares, and in the fight that ensued, the Sikhs having thrown away their muskets, attacked our men sword in hand, and killed and wounded numbers of them. The following extract from the despatches announcing the victory achieved by the army of the Sutlej over the Sikh army will show how the 16th Lancers suffered, and also, we think, what an incomplete weapon the lance is ; inasmuch, though perfect for offence, it is much inferior to the sword for defence.†

* Napoleon, by a decree dated 25th November 1811, attached a regiment of lancers to every division of cuirassiers.

† Colonel Voyle, in his Military Dictionary, gives his views thus :—"During the Sutlej campaign, the 16th Lancers, in charging the Sikh Infantry, are said to have suffered from wounds on the arm inflicted at the moment of thrusting the lance, by sword cuts from wounded Sikhs. This fact shows the necessity of the lance arm being protected by some sort of defensive armour." From this it also appears self-evident that, in order to make the lance a complete weapon, it is necessary to add the sword as its supplement, or as its complement, whichever phrase the reader prefers.

Casualty Return of the Force under the Command of Major-General Sir H. G. Smith, K.C.B.

CAMP ALIWAL, January 29th 1846.

CAVALRY.

First Brigade.

H. M.'s 16th Lancers, 2 European officers, 56 men, 77 horses, killed ; 6 European officers, 77 men, 22 horses wounded ; 1 man, 73 horses missing.

A total of 8 officers, 134 men, and 172 horses placed *hors de combat* in one action. They might indeed have exclaimed, as did Pyrrhus after the battle of Heraclea, "Another such victory, and I return home alone." This loss of life could not have happened if the rear rank of the lancers had been swordsmen ; for in their turn they could have attacked the Sikhs, and so protected the front rank, whose lances were worse than useless, for they were an encumbrance to them in the *mélée*.* Taught by experience, lancers now fully recognise the necessity of being supported by swordsmen ; and in consequence it is not uncommon for them to receive the following order before advancing to the attack : "Rear rank ; Left arm sling lance ; Draw swords," thus remedying the evil to a very partial extent. This measure is, however, only a makeshift, and cannot be recommended, as it is evident that a mounted soldier, to use his sword with full effect, must not be hampered with a lance slung on his left arm. Jomini advises that a charge of lancers be invariably supported by hussars in the second line, to follow up the onslaught, penetrate the enemy's ranks, and complete the victory,—counsel judicious and politic enough it is true, but, *per contra*, hussars for the second line may not always be available or at hand when wanted ; hence it would be better to have them both in the same corps if possible Sir Hope Grant employed his cavalry in the Mutiny in the manner recommended by Jomini, and with very good results ; for in his "Sepoy War," we read that, in the attack on Meeangunge, the 9th Lancers ran them through, the 7th Hussars and Irregulars cut them down without quarter, 500 were killed and 400 made prisoners. Perhaps the best plan of all is that which was adopted by the 16th Lancers after their victory at Aliwal. The men in the rear rank, we are told, sometimes threw away their lances and drew their swords,—a breach of discipline no doubt ; but then experience teaches, and if this be true, the men were only following the obvious suggestion of common sense, one of the best of military guides charge.

* "There can be no doubt that single-handed a good lancer is superior to any swordman, and that no weapon creates so great a moral effect, but in a *Mélée*, the lance is comparatively useless, and it strikes me, that the rear rank of a lancer regiment, should always charge with lancers slung on the left arm, and swords drawn." (The British Cavalry, by Capt. Valentine Baker, 10th Hussars, 1858.)

In support of our argument we may here bring forward some remarks made by a non-commissioned officer of a Lancer Regiment ; and being the results of actual experience, they are accordingly entitled to a fair hearing and impartial judgment. "The views you entertain on the subject of the lance, especially as to its *uselessness in the rear rank* tally exactly with the opinion I have formed, and which is based upon, personal experience in the ranks. During the time I have been in the service I have endeavoured to study the advantages, supposed or real, possessed by this weapon over all others (for cavalry), and certainly must admit that, with the present regulations as to one horse's length from front to rear rank, I think it utterly useless for the rear rank, especially as that rank is in a measure defenceless even at the moment of the shock, for the front rank only, charge at the 'engage,' the rear being compelled up to the last moment to ride at the 'carry,' and would probably find itself among the hostile forces before it could bring the lance to the 'engage ;' whereas swordsmen in the rear rank would be always on the defensive." Apparently the sentiments of this non-commissioned officer and that of Katherine in Shakspeare's *Taming of the Shrew* are somewhat similar. For Katherine, when telling Bianca and the Widow of their duty to their lords and husbands, says—

"But now, I see our lances are but straw ;
Our strength as weak, our weakness past compare ;
That seeming to be most, which we least are."

If the reader agrees with us in admiring these few lines, and is further of opinion that they epitomize fairly the project we have endeavoured to discuss, then all that remains to be said on our part is, *Rem acu tetegisti*. But as in all probability his ideas on the subject are yet unchanged, it behoves us to make another attempt to modify, if we cannot overrule, any objections that may be urged against the proposed plan of armament.

Nolan's views of the lance as a weapon to be used to break infantry as well as cavalry will now be considered. He says—" All seem to forget that a lance is useless in a *mélée*; that the moment the lancer pulls up and the impulsive power is stopped, that instant the power of the weapon is gone. It requires speed to drive a lance home, and it must be carried into the object by the horse. At speed you can drive a lance through anything, but not so at a slower pace, and at a walk and a stand you become helpless, and the thrust can be put aside with ease, or the pole seized with the hand." Now, this axiom of Nolan's is mathematically, as well as literally correct; for we know that it is the mass multiplied into the velocity that gives the power or force in moving bodies; and that directly velocity ceases, the momentum or quantity of motion is lost.* A cavalry charge is not a permanent force, like pressure, or the

* "But no horseman in the world could get one of this sort over the top bar of an *astaglionata* (timber bullock fence of Campagna), although this grey was made to make his way through a good many fences of the kind, on the principle that the impetus is calculated by multiplying the weight into the velocity." (*Autobiography of Count Victor Alfieri*.)

force of gravity ; *vice versa*, it is a force of impulse, or percussion, like the smart blow of a hammer. When two moving bodies come into direct collision,* as they do, or ought to do, in a cavalry combat, then, being partially elastic bodies, the momentum gained or lost by one of them is equal to that lost or gained by the other ; or, in other words, action and reaction are equal and in opposite directions. We have thus two distinct phases in a cavalry charge, *viz.*, action and reaction, or, as they are more vaguely and commonly defined, the charge and the *mélee*. For the moment of action, beyond all doubt, the lance is the weapon to employ,—it, will produce both moral and physical effects ; but for the last stage,—the moment of reaction, it is immeasurably inferior to the sword. In short, when the lance has lost its impulsive power, or velocity, then the sword should come into play to achieve the victory which has been rendered possible by the "Queen of Weapons." It must be recollected that it is during the period of reaction that either one or other of the parties must be driven back, provided they have both advanced to the charge in an equally determined manner ; hence it is absolutely necessary that the soldier should have the weapon most suited for this stage of the engagement, which is allowed by all authorities to be the sword, their decision resting on the fact that, if the first push of the lance is parried, or happens to miss its aim, it is not easy to recover the weapon and repeat the thrust ; but it is not so with the sword, which may be readily withdrawn from its blow, wielded with celerity and directed to any part of the body, particularly to the head and arms, while its motions defend the person using it. On the other hand, the sword is inferior to the lance for employment in the shock, or first moments of a charge, as also in the pursuit. It is then in a combination of these weapons that safety should be sought. De Brack, in his *Outposts of Light Cavalry*, says that the weight of a trooper at the charge augmented by his speed is fully equal to 833 lbs., which he thinks should overthrow everything.†

This last assertion of De Brack's opens up a new field of inquiry, and one which has been studied very little, if at all, in our service, *viz.*, "The Dynamics of Cavalry Charges." The only writer on the subject we are acquainted with is Pictet, a French military author,‡ who wrote a work, about A. D. 1750, on the means of commencing completing, giving, receiving, leading, executing, pressing, supporting,,

* "As for two bodies of cavalry meeting in full swing, this happened repeatedly, and in contradistinction of the old belief, that one of the two half turns before the final shock. We must, therefore, for the future, study the causes that lead both to success and to the reverse." (*The French Cavalry in 1870*. By Lieutenant-Colonel Bonie)

† Cavalry tactics may be defined as a system having for its chief object violent and uniform percussion. To produce great and decisive results, actual collision is, as a rule, very necessary. Infantry tactics, on the contrary, consist of ordered and constant pressure, which, with the modern rifle, may be applied at any distance up to 900 yards. Actual contact between opposing parties of infantry therefore happens but seldom.

‡ Pictet no doubt derived the greater part of his information from Borelli's work on *Percussion and animal Mechanics*, published so long ago as A. D. 1650. If the reader is at all interested in this subject, Marey's treatise on "Animal Mechanism," and Lieutenant Colonel Bonie's, *Fond et Vitesse d'une troupe de Cavalerie en Campagne*, both recently published, will repay perusal.

neutralizing, and repulsing cavalry charges. His ideas are profound, and worthy of study, and, at the time they were written, contributed in a marked degree to give a new direction to the system of cavalry tactics. How De Brack arrives at the conclusion that the impulsive power of a trooper proceeding at the charge is equal to 832lbs. will now be investigated. Momentum is compounded of the mass of a moving body multiplied into its velocity, or, as it is expressed in gravitation units, momentum = $\frac{wv}{g}$; but in absolute units, momentum is wv . We however only have to deal with the former unit, and in England the numerical value of g is taken as $32\frac{1}{2}$. Hence, taking the average weight of the horse with its rider and equipment at 1,280lbs.,* and the rate of the charge at 20 feet per second, we have $\frac{1280 \times 20}{32\frac{1}{2}} = 795$ lbs. This represents the momentum, but the useful effect of the whole accumulated force of any moving body is, in most cases, proportional, not to the momentum, but to the *vis viva*, which again is equal to the product of the mass of the body into the square of its velocity. Taking the same data as before, we have $\frac{1280 \times 20^2}{32\frac{1}{2}} = 15,916$ lbs.; of course, these products are only useful for comparison with other products similarly obtained by the use of the same units. De Brack may, however, have considered the laws which govern the direct collision of bodies, and by impulsive power may mean impulsive force,—a force which we know acts with great intensity during a very brief time. In this case the following example will hold good:—Let a body whose mass is m , moving with a velocity v , impinge directly on another body m' , moving in an opposite direction, and with a velocity v' . Let R denote the impulsive force, which during the first part of the impact acts on each body in opposite directions, then $R = \frac{mm' (v + v')}{m + m'}$. Thus, a body weighing 1,280 lbs. moving with a velocity of 20 feet per second, impinges directly on a body of the same weight, and moving with the same velocity, in an opposite direction, to find the impulsive force at the moment of impact.

$$R = \frac{mm' (v + v')}{m + m'} \\ R = \frac{\frac{w}{g} \times \frac{w'}{g} (v + v')}{\frac{w}{g} + \frac{w'}{g}}$$

* The weight of man and horse, in the various armies, is as follows:—

Austrian Hussar	...	... 1,110lbs.
French Dragoon	...	... 1,290,,
Prussian Cuirassier	...	... 1,540,,
Do. Lancer	...	... 1,250,,
English Hussar	...	... 1,220,,
An average of about	...	... 1,280,,

From data $w = w^1$ and $v = v^1$

$$\begin{array}{c} \frac{w^2}{g^2} \\ - (2 v) \\ \text{Hence } R = \frac{\frac{w^2}{g^2}}{2 w} \\ - \\ g \end{array}$$

$$R = \frac{w}{g} \times v$$

$$R = \frac{1280}{32\frac{1}{2}} \times 20$$

$$R = 795 \text{ lbs.}$$

This result sufficiently approximates to that given by De Brack, viz., 833 lbs. It should be noted that bodies moving in opposite directions with equal momenta will remain at rest after impact, supposing the bodies to be perfectly elastic bodies, the whole momentum of each will be destroyed during the compression which occurs on impact, and an equal one will be generated by elasticity in the opposite direction, on the bodies recovering their original form; each body will therefore be reflected with a velocity equal to that which it had before impact. But in the case of partially elastic bodies, as before pointed out, the momentum gained or lost by one is equal to that lost or gained by the other; or in other words, action and reaction are equal and in opposite directions. Of course, this attempt to elucidate the mechanical properties of cavalry charges is purely theoretical, and cannot be of very much, if of any practical value; but at the same time theory and practice should be combined in such a form as to make things easily understood, the difficulty being to put it before the reader in such language that he can judge for himself whether or not any given case has been made good. Here we have endeavoured to show that the lance requires to be moved with a velocity of so many feet per second, in order to gain its impulsive power; and being a thrusting weapon it penetrates in a ratio which varies as the speed and weight of the horse. The sword being chiefly a cutting weapon, centrifugal force is required, which is obtained by a rotatory motion of the soldier's arm. In the one case the useful effect is produced by the horse, and in the other by the rider. The lance is best adapted for use when in fast motion, and the sword when at a slow rate of speed, or at the halt. Hence, by combining these weapons in support of each other, every possible contingency of war is provided for, as far as the use of edged and pointed weapons is concerned.

At first sight it may seem absolutely incorrect to state that the advantages of the lance chiefly depend on the good qualities of the horse. History, however, furnishes abundant proofs that the view here taken of the matter is not at all one-sided or illogical. Montecuculi says that in his time the lance had to be discontinued owing to the difficulty of

obtaining horses suitable for its management. Maurice of Nassau also gives the same reason for objecting to the lance as a weapon for cavalry. Gustavus Adolphus, at the beginning of the Thirty years' War (1630) on similar grounds deprived his men of the lance. Roemer in his work, when describing the German reiters says—"Their great success largely contributed to the disuse of the lance, which, for various reasons, was at that time rapidly declining in favor. Not the least reason for this was the difficulty of procuring suitable horses for the proper wielding of this weapon. So the lance disappeared rather from the force of circumstances than from any acknowledged disadvantage of the weapon itself ; on the contrary, it continued to be styled the "queen of weapons," but it was considered useful only in the charge. In the paper before referred to, translated from the German by Major Warren, it is stated—"The French have disbanded the Lancer Regiments, probably as the men and horses are not considered physically equal to the development of the powers of the lance." Further on—"The Uhlan remounts must be from the best horses Prussia can provide, not the refuse, after the cuirassiers have selected the most powerful, and the dragoons and hussars the most active. The horse's feeding should be more liberal, to enable him to undergo a severe course of training to fit him for single combat with the lance." Under these circumstances we think that the system now described can fairly claim one great merit, and that is, it removes the principal, and, indeed, only objection to the lance. There can be no difficulty in selecting half the horses of a regiment for the front rank suitable for lancers, and giving them a special training. The remainder can be given to the rear rank, and broken in as usual ; it not being so important for them to have perfect horses, as it is for the front rank. The difference between a lancer and an hussar lies in the fact that the horse in the one case, although he does not actually use the weapon, produces all the useful effect ; while in the other, the rider must be mainly depended upon to effect any marked results. The lance is a weapon which requires skill on the part of the horse ; the sword on the part of the man. A lancer who is a good rider and mounted on a perfectly broken horse is a man to be dreaded, but not so when fate or want of training has given him a bad or indifferent charger. The Uhlan officer before quoted says—"Horses badly formed and untrained men who cannot ride, these are as unsuitable in a lancer troop as a sieve to carry water." It may be safely asserted that the lancer should spend most of his time in *training* his horse to the exercise of the lance ; and the hussar in teaching himself the use of the sword and carbine. As regards training, a lancer's charger should be perfect, but that of the hussar, comparatively speaking, need only be very good. The project advocated offers every advantage for this classification, as both men and horses can be drafted into the class for which they are by nature or inclination best fitted for.*

* A very distinguished cavalry officer, when giving evidence before the Lords' Committee on the supply of horses in England, said—"Formerly the men were much larger. The men having been classified, we have also been able to classify the horses." Extend this principle and classify their training. It is reasonable to suppose that a horse broken in to suit a cuirassier would not be at all fit for a lancer, and vice versa.

The art of war can, and does derive, the greatest benefit from a study of the peculiarities of both men and animals. But study alone will not suffice ; the peculiarities of nature, when known, have to be applied to the greatest advantage. This in nearly all cases is best effected by selection and a properly organized division of labor,—a method which, although it does not regard all things as alike, or all men as automata, has nevertheless worked wonders in modern times. The tendency in affairs military is to employ the material placed at their disposal in this way, rather than as was formerly the case,—as part of a complicated machine running in one unvarying groove. Moreover the phrase *nous avons changé tout cela* does not now cause the consternation it used to. This will be of itself a sufficient apology for recommending what may well seem to be innovations, but which are in reality only renovations.

We have been told of the fate of the troopers that attacked the Sikh squares at Aliwal with the lance only. Now, compare Captain Saxton's account of the Battle of Kooshab, where the sword was used,—an action fought with equal success and without such great loss of life. "The most modern instance of a charge of cavalry against infantry, thoroughly pushed home, occurred during the Persian campaign of 1856 at the Battle of Kooshab (the pleasant water). The Persian regiment of Fars, drilled after the European fashion, and armed with muskets and bayonets, formed square, and in that order was charged by the 3rd Bombay Light Cavalry. The three leading officers leaped their horses upon the bayonets, sacrificing them, of course, and so broke the square. The Bombay troopers poured through the gaps and plied the sabre so well that out of five hundred Persian infantry only some twenty escaped to tell the tale." Surely no greater proof than this can be given to show that when once "the thin edge of the wedge is inserted" the remainder of the task becomes comparatively easy. To use a mechanical simile, we may compare the lance to the head of a wedge, the sword being its base, whilst the force of percussion or blow with which the back is struck should be delivered by horse and rider.*

In all the incidents which have been brought forward to sustain our argument, the lance, as it generally should do, preceded the sword ; but there are some rare occasions when it may be found necessary to make the lance follow the sword, thus reversing the usual practice. De Brack calls attention to this, and we quote him as follows :—" Our pivot flies in the lancers of the Imperial Guard *did not* carry lances. I remember that upon two occasions in 1814 (at Hoogstraten near Breda,

* In the Rotunda at Woolwich may be seen a Russian lance which has a breech loading pistol (barrel only) firmly attached by leather thongs to the shaft. When the soldier rides at the engage, the pistol is in front of the right hand, forefinger touching the trigger. The inventor's idea was that the charge should take place in the usual manner, and at the last moment, just before the shock took place, the pistol could be fired, the enemy therefore running the chance of being both shot and speared, a very curious attempt to ravage with fire and steel. This compound arm may seem to be original, but it is not so. In the Soltikoff collection there is a hunting spear of the sixteenth century, with three wheel-lock pistols, and two "hallebarde" hooks.

and at Pont-atrein below Lisle) having to deal with Russian and Prussian lancers, who, like ourselves, held their own upon narrow roads, with deep ditches on either hand, I placed at the head of the column intrepid carbineers, whom I made my lancers follow ; these last put their lances in the bucket and drew their swords. Having once entered the jammed mass of the enemy, we cut them down without danger to ourselves." This affair clearly shows how a regiment armed on the principle we are discussing would always be prepared for any possible emergency. If it was necessary to fight in a street, or any confined place, where, owing to want of room, the lance could not be used with proper effect, the rear rank could then be placed in front, and the difficulty at once obviated. De Brack further calls attention to the necessity of lancers being supported by swordsmen, under certain circumstances, such as having to fight in column, or in a street, &c. He says—"The lancers jammed together can neither point nor parry, and one of two things must take place,—they will either throw down their lances to get at their swords, in which case you are on equal terms, or else they will retain their lances ; and in this second case you will have the best of the bargain." A more modern authority, Hozier, in his *Seven Weeks' War*, gives an account* of two very spirited cavalry skirmishes which took place during the advance to Brunn, when the lance was engaged in real battle with the sword ; in one case the lance being victorious, and in the other the sabre. The circumstances attending these encounters are extremely well described, and unmistakeably prove that the lance and sword must not be used separately, but in support of each other. The passages alluded to are too long to quote *in extenso*, but will well repay perusal, as will also the Chapter on Cavalry, in Boguslawski's *Tactical Deductions from the War of 1870-71.*† One sentence we will draw attention to. It is as follows :— "But it no longer applies since the introduction of breech-loading rifles. The *morale* of cavalry will not be affected if lancers are properly instructed as to the use of these arms."

Many other examples from military history might be brought forward, in order to more fully demonstrate the desirability of arming light cavalry both with the lance and sword ; but the above instances will we think, suffice to show that the system is neither founded on mere theory, nor based on rash speculation.‡ On the contrary, the highest authorities have been quoted, and a sufficiency of cases have

* Volume II, Book IX, Chapter I.

† Translation by Colonel Lumley Graham.

‡ In a lecture on the Organization of Cavalry by a distinguished cavalry leader, the following remarks were recently made ;—" But it appears to me that the lancer—and I am an old lancer myself—is thoroughly over-armed. Notwithstanding assertions made by American officers, I believe that a pistol is a demoralizing and dangerous weapon for a cavalry soldier. Moreover, as at present armed, a lancer is not well qualified for outpost or scouting duties. I would suggest that he should be armed with only a lance and carbine ; the lance is a splendid weapon if well used. Teach him to rely upon it utterly and implicitly. Moreover, if armed with a carbine the lancer would be exceedingly serviceable for any temporary dismounted duties, as he could leave his lance slung upon his horse."

been given, to prove that an inductive argument, drawn from the facts which history records, is the basis on which the organization rests. It may here be objected, and with justice, that if this system is so perfect, both in theory and practice, why is it not generally adopted by the cavalry services of other military nations. To this question we answer that Russia, Prussia, Austria, and Italy, all have of late taken away the lance from the rear rank, and supplied in its place the sword and carbine. England is one of the few nations which still retains the lance in the rear rank. In Russia the front rank of cuirassiers and hussars carry a lance, or 5lbs. 6oz. additional. The rear rank of the lancers have no lance, or 5lbs. 6oz, less (*Hozier's Cavalry Equipment.*) In Prussia a number of men in each squadron of Uhlans have been deprived of the lance, and breech-loading carbines furnished instead : these men are especially destined to operate as scouts, or to fight on foot. The need of a good firearm was so generally recognized in the late Franco-Prussian war, that, after a few weeks' campaign, some of the Uhlans abandoned their lances for chassepôts picked up on the field of battle, and their generals never thought of putting a stop to this transformation of lancers into dragoons (*Etude sur la Tactique de la Cavalerie, par A. De Formanoir*). In Austria, lancer regiments have 32 men per squadron, distributed equally among the four sections, armed with the carbine instead of the lance, and placed in the centre of the rear rank, the object being to enable these regiments to employ a certain number of men, when necessary, as infantry. (*Woinovit's Austrian Cavalry Exercise*). In the Italian army the heavy dragoons and lancers are armed with lance and pistol in the front rank, and the rear rank with sword and carbine. As for the French, since their last great defeat they have totally abolished lancers, and the cavalry now consists of 12 regiments of cuirassiers, 12 of hussars, 20 of chasseurs, and 26 of dragoons, besides 4 regiments of chasseurs d'Afrique, and 3 of spahis for Algerian service. It is thought, however, probable that the lance will be re-introduced for the front rank of a certain number of regiments. We may remark that the French were the first nation to adopt, as they have been the first to abolish, the lance.* In 1807, Napoleon raised an experimental regiment of Polish lancers, to which he soon added five more Polish and seven French ; these lancers have been the model of all the lancers of Europe. Both in the Peninsula and in Russia, lancer regiments did good service ; at Leipzic the Cossack lancers inflicted great loss on the French cuirassiers ; and at Waterloo a regiment of French lancers told severely on the Household and Union Brigades.†

Again, it may be urged, notwithstanding the example set us by

* Pliny attributes to Etolus, son of Mars, the invention of the lance which he called " jaculum cum amento," that is, a spear with a leather strap. Varro regards the Spaniards as the inventors. Hirtius, who wrote the eighth book of *Cæsar's Commentaries* of the Wars with the Gauls, says—" Lancea infesta medium femur transjicit;" thus the name is undoubtedly Roman.

† Lancer Regiments were first formed in England about September 1816, from some Light Dragoons.

foreign nations, as above detailed, that our native Cavalry are sufficiently well armed ; this may be the case, but still the mounted branches of most foreign nations have recently improved both their armament and equipment. Even the Cossacks of the Caucasus and the Don, those "traditional borers," who not so long ago were armed with a slight fir tree rudely tipped with a pointed nail, have now been provided with breech-loading carbines. Schools have been established for the instruction of their non-commissioned officers ; they are taught to fight dismounted ; and in short, all necessary steps have been taken to put them on a footing of tactical equality with the other light cavalry regiments of the Russian Army. An interesting account of Russian cavalry tactics will be found in the *United Service Magazine*, and also in *Russia's Advance Eastward*, by Vincent.

This paper is headed by a quotation from Jomini, to the effect that "superiority of armament gives increased chances of victory in war." We may now add the following precepts :—"The moral power of soldiers is much increased by the feeling of security which they have when they are conscious of being well armed, and know how to use their weapons." "The armament and equipment of soldiers should be suited for the duties they have to perform in presence of an enemy." In good earnest, these maxims have often been proved to be something more than mere truisms or theorist's formulæ. For instance, the great victories of Cressy, Poictiers, and Agincourt were gained by the superiority of the long-bow over the cross-bow, the usual weapon of foreign archers. Gustavus Adolphus and Fredrick the Great owe most of their successes to improvements effected by them in firearms. Inferiority in Artillery was nearly fatal to the French at Eylau and Marengo. The Austrians in 1859 suffered much from the rifled cannon of the French ; and, again, in 1866, the breech-loading rifle of the Prussians was the principal cause of immense losses to the same unfortunate nation. All these examples tend to show that superiority of armament is an advantage in warfare not to be despised, for it increases the probabilities of victory. This, then, is our apology for once more bringing to notice a system of armament which many high authorities, both in our own and foreign armies, think the best for mounted soldiers under all the diversified conditions of war ; not that we claim the credit of being the first, to set forth its advantages, for many previous writers have discussed its merits. Quite recently an essay on Native Cavalry has been published,* from which we extract the following remarks :—"The advantages of arming the front rank with the lance, sword and pistol, and the rear rank with the sword and carbine, are almost self evident when we reflect that Native Cavalry is essentially Light Cavalry. The lance has been frequently styled the 'queen of weapons,' and so in many situations it certainly is ; but the sword has also its own peculiar excellencies, and these are just of the nature to yield effective aid to the lance on occasions, such as a *mélée*, when the length of the latter becomes an embarrassment to its wielder. The strong side of a swordsman is his right one, of a lancer his left. We could therefore

* *En Avant*, by Major A. R. D. Mackenzie, 3rd B. C.

train the swordsmen of the rear rank always to range themselves, after the moment of attack or during the *mélée*, on the right of their respective front rank lancers. Not only this, but these two men, the lancer and carbineer, should be at all times taught to consider themselves comrades, should share a baggage pony and grass-cutter between them, and should never be separated in quarters or in the field, except when the rear rank is employed on dismounted duties. The only alteration which we would suggest in ordinary drill is, that on the advance to the attack being ordered, the rear rank should not partake of the increased pace of the front rank until a distance of twenty yards had been established between them. By this arrangement the drawbacks and inconveniences of the two ranks would be got rid of, while the advantages would be retained. In the present close formation, the rear rank cannot see where it is going, and if men or horses fall out of the front rank, it is impossible for those behind to avoid galloping over them, while the knowledge of this fact is not calculated to inspire confidence in men who feel that, should they or their horses be wounded by the fire of the enemy, they run a serious risk of being immediately trampled to death by their friends.* The lance would deliver the first shock, and, if momentarily checked, the sword would join the *mélée* and there can be no dispute that the latter weapon would in these circumstances be more useful than a fresh accession of the former."†

We will now assume that the advisability of arming cavalry in the manner we have been discussing and analyzing has been conceded by our readers, and purpose to set forth a few of its most apparent advantages. It has been remarked, by more writers than one that "a characteristic of the present age is division of work, and the substitution of skilled for unskilled labor, and nowhere are the effects more marked than in the organization of modern armies." Now this dictum precisely indicates the great merits of the system we are advocating ; for instance, men who are skilled in the use of the lance and proficient at tent-pegging, &c., can be placed in the front rank, while all the good shots of the regiment and the best swordsmen can take their place in the rear rank. Horses that will not stand steady when a carbine is fired from their backs can be given to the lancers, and *vice versa*; those that are quiet under fire should be ridden by the carbineers.‡ Nolan's maxim

* Shakespeare describes this well, in his *Troilus and Cressida*. Ulysses says :—

"Or like a gallant horse fallen in first rank,
Lie there for pavement to the abject rear,
O'errun and trampled on."

+ This latter statement is not mere theory, but plain fact ; for Colonel Marey in his Memoirs say :—"I was informed by Major J. Crovone of the Sardinian Staff Corps, that the Piedmontese Lancers, in the Campaign against the Austrians in 1848-49, found at times great difficulty in withdrawing the lance from the body of the wounded enemy. Under such circumstances the advantage of having the rear rank armed with swords, to protect the front rank after the first shock, and complete the victory, becomes apparent at once.

‡ Arabic *karab*, a weapon. The etymology of this word is disputed. Some pretend that it is derived from the Spanish *cara*, and Latin *binus* a double man, i. e., both for attack and defence. Roquefort says it comes from the Italian *Carra bina*, double arm. The derivation first given is however generally accepted as being correct, for *karab* means both a weapon and a combat, and was first used in this sense by the Moors in Spain.

must not be forgotton—"However good your cavalry soldiers may be they are not all fit for the front rank; neither are all horses fit to lead though all will follow." If skirmishers, scouts, patrols, or men for dismounted service are required, then the whole of the rear rank armed with breech-loading carbines are available; the front rank, holding their horses and supplying a mounted party to act as reserve, guard the flanks, and cover the remounting of the dismounted men, &c. In this manner one-half the regiment, who would be good shots, and trained constantly to fight on foot, could be employed on dismounted service, or any other duties that entail the use of fire-arms. The instruction of the soldier also becomes much easier, for, having ascertained whether he is fit for a lancer or a carbineer, then all that remains is to teach him his own particular duties. Young soldiers should however, in all cases, first receive a general training. As regards the front rank, the wonderful moral as well as physical effects of the lance must be taken into account. Almost the only instance on record where British infantry have been destroyed by cavalry charging, took place at Albuera, when the Polish Lancers, getting in rear of General Stewart's division, nearly annihilated Colborne's brigade. De Brack tells us that "Some arms have a more imposing appearance than others. At Waterloo, our four regiments of guards happen to be in line together. The English charge this line. We, others of the lancers, put our lances in the rest: at this movement the enemy spontaneously wheel clear of our front to throw themselves on those regiments which have short weapons." This dread of the lance was not without cause, as in the retreat from Quatre Bras the 7th Hussars had been roughly handled by the French Lancers. Again, Nolan is of opinion that the advantage of the lance lies in the moral effect produced (particularly on young soldiers), not only by its longer reach, but by the deadly effect of its home-thrust. It seems probable therefore, that for charges in line, the front rank armed as lancers, and the rear as hussars, is the best possible formation. The front rank will charge well home, knowing that swordsmen are close at hand to assist and support them, while the rear rank, in their turn, will be equally confident when they consider that the lancers will make a gap in the hostile line for them to penetrate into and destroy the enemy. On the other hand, it will not increase the enemy's equanimity, or inspire them with courage, when they find that if they escape the lance-thrust, the sword still remains to be met and conquered.* Also, after a charge, or when dispersed in pursuit, the squadrons with the greatest rapidity and ease can "rally" and "tell off." The difference between front and rear rank being so marked, De Formanoir, in his *Tactique de la Cavalerie* says—"All cavalry that

* In charges of Cavalry *versus* Artillery, executed in skirmishing, or open order this system of armament ought to give good results, for the lancers could attack the escort and gunners, whilst the carbineers kept up a fire on the battery and limbers, shot wheel horses, cut traces, &c.—a division of labor that should ensure success. In the French and Prussian Cavalry this mode of attack is much practised; it is known as the *charge en fourrageurs*, it being the opposite to the *charge en muraille*, that is, in line without intervals.

rallies promptly is a precious instrument in the hands of its commander. Cavalry that, after a charge, loses all tactical bonds, and contents itself with a momentary triumph, is only an imperfect arm. It cannot pursue the defeated squadrons. It is exposed to sudden and terrible returns or reverses of fortune. The first duty of a conqueror is to rally his troops, and to prevent the rally of the vanquished, technically to keep the sabre to his ribs. This power of being able to rally quickly and easily is therefore not one of the minor advantages that pertain to this system; on the contrary, it is of the greatest importance.

Bearing on our subject is that much-vexed question "The Rank Entire system." This single rank formation can, with the greatest facility, be made for a regiment armed as we propose; and there are many occasions when it would be found very useful, *viz.*, to deceive the enemy by making him believe in the presence of more considerable forces than really exist, or to present an extended front while keeping back the reserves.* Such a formation is especially useful at the end of a campaign, when the squadrons having suffered great losses, it is important to retain the extent of the normal front. Again, perhaps, for some specific purpose, it might be expedient to employ lancers or hussars separately. In this case no difficulty presents itself, as the squadrons could be made up as required, either as lancers or carbineers. An attack much practised in the thirteenth and fourteenth centuries was made in the following manner. The squadrons were composed of from three to five ranks, alternately lancers, and dragoons, and the charge executed as in the movement. "Attack by alternate squadrons." It was known as the *coup de lance*, and proved to be of no practical value, it being a mere *manceuvre de théâtre*, as indeed is the case with the modern form of the drill; the mistake, of course, being to teach men to ride at, instead of over an enemy.†

* Prior to A. D. 1560, cavalry (especially those armed with the lance), as a rule fought in single rank. If a second rank was formed, it consisted of an inferior class of soldiers, such as archers, valets, &c.

† There is perhaps no greater or more common error in cavalry tactics than the custom of retiring immediately after an advance in line. This form of drill cannot sufficiently be deprecated, as it is quite contrary to the golden rule, *viz.* "An advance to the attack should always be succeeded by some kind of forward movement," and not, as is too often the case, by the manœuvre, "Retire by fours from the right of squadrons." To practise what are called "attacks in the air," that is, without placing a skeleton enemy, is bad enough, but if in addition to this, men and horses are deliberately taught to wheel about on reaching the objective point; it cannot be at all surprising that, in the opinion of the rank and file, it is sufficient to ride at, instead of *over and beyond* the enemy they are desirous of destroying. On this account many tacticians think that the word "Charge" should be abolished, and, "Shock" substituted, as it conveys a clearer impression to the minds of soldiers what is required of them. Marshal Marmont, in his *Institutions Militaires*, say—"There is a common practice at drill, in great manœuvres and sham fights; a body of infantry is charged by cavalry, and as it is merely the representative of a combat, the cavalry stops before reaching the infantry or charges through the intervals. Nothing can be worse than this education for the horses; if we thus accustom them to avoid the obstacle, we shall never be able to make them overthrow it, for the habit in which we have trained them will be in accordance with their instincts, and perhaps with those of their riders. This practice is pernicious; it ought to be banished from our exercises, and an exactly opposite lesson substituted;

Enough of the advantages of the system have been enumerated to point out a few of its most patent merits, and naturally now comes the crucial question—What are its disadvantages? They may be summed up in the two words ‘Mixed Armament.’ It is an old maxim that men differently armed and equipped should not be placed in the same corps, for this creates rivalries, and renders instruction difficult, but, as Boguslawski points out—“In all such sayings there is a certain amount of truth. There is no greater mistake however, than to make such an argument applicable to all eternity.” There is no finality in the art of war; the old order must give way to the new; but, at the same time, in military affairs, alteration or modification may often be found advisable; revolution and subversion, seldom or never. Such being the case, the matter simply resolves itself into the advisability, or not, of making certain changes in the armament of light cavalry. We have seen that Russia, Prussia, Austria, and Italy consider there are sufficient grounds to warrant the innovation, or rather renovation, to a certain extent, inasmuch as they have condemned the lance as a weapon for the rear rank, while France has condemned it altogether. Whether their decision is based on sufficient grounds for the cavalry of our service to follow their example is quite another question, and one that the reader must answer himself. It should not be forgotten however, that they have the actual experience of many recent campaigns to guide them. The army of a nation which assumes for its motto *vi et armis* has a great advantage over one which is of opinion that the preservation of the *entente cordiale* at all hazards is a matter of vital necessity. In the one case, periods of strife being the rule, the actors can observe and draw conclusions; in the other, a life of comparative repose will permit the by-standers to compare and study only. The one, as regards military education, is self-taught; the other of necessity receives it second-hand. To those who are of opinion that all that has been written on the subject is theoretical, and could not succeed in actual practice, we would beg leave to remark that the strength of any scheme lies in its idea or plan, whether original or copied, just as much as it does in its execution. In all human designs two things are required, theory and practice. Granted the former correct, the latter is simply a matter of time, labor, and expense. In affairs military, the former requisites are generally available; money not so. Financial reasons take precedence of military requirements as a rule. In no way, however, can the system be called an expensive one, rather the contrary, as only half the carbines now in use would be required. A regiment of

the results would be immense in actual war.” That this exposition of Marmont’s views is correct, may be proved by the fact that in the whole history of warfare, there are but few authenticated cases of infantry squares having been broken by cavalry charging. Of course, it cannot be exactly stated how much defective instruction in time of peace has had to do with this; but the proverb “Train up a child, &c.,” affords some clue to the mystery. The Russians recognize the truth of this; for in Russia’s Advance Eastward, by Vincent, we read the following.

“To prevent the men falling into the habit of halting before an enemy by doing so in peace manœuvres; when friendly foes meet, the men charge through each other, holding their rifles perpendicularly aloft.”

cavalry (now that firearms are judged only to be useful on foot) can seldom, or indeed never we may say, employ more than one-third of its carbines at the same time. Why give them so many? They are not ornamental, and some other weapon substituted might be more useful. This is the theory. The practice has been, and is now at this present time in use (as regards lancer and cuirassier regiments) in nearly all cavalry services except our own. Whether the principle should be extended to all mounted regiments is quite another matter. The consciousness that strikes those

“That never set a squadron in the field,
Nor the division of a battle knows
More than a spinster.

prevents any dogmatic opinion on the subject. This knotty point must perforce be left for other than carpet-knights to decide. Fortunately for this world perhaps, investigators and propounders of theories have not often the power of putting them into execution. This is the reason why so many cunning and well-devised schemes never get beyond the embryo stage of their existence. But, notwithstanding this truth, neither a criminal nor a measure should be condemned without a fair trial.

Whilst writing this essay, further researches into history have enabled us to lay before the reader some remarks made by Roemer in his valuable work on *Cavalry: its History, Management and Uses in War*, a book that cannot be too strongly recommended for its merit and ability. They are as follow:—“The lance, which since the close of the sixteenth century, has gradually fallen into disuse, maintained its national existence in Poland, whose cavalry, much later than any other, remained similar to that of the age of chivalry. At its re-organization in 1817, the Polish army contained both heavy and light cavalry. The former consisted of a hundred and forty-four companies, half of which, armed with lances, formed the first rank, while the other half, armed with carbines, formed the second. Each man had also sword and pistols.* This heavy cavalry was further divided into husarz and pancerny.” Roemer, after describing the dress of these men, goes on to

* Hussars were instituted about 1359 (Hussars is derived from *husz*, 20, and *ar*, price) British Hussars first enrolled in 1759. Pancerny is derived from the German *panzerhemd*, so Bardin says in his Dictionary. The Polish word *pancerna* signifies a soldier of noble birth. This branch of the cavalry, according to Voltaire, was subdivided into two classes, uhlans and gendarme or Cataphractaire. This last word is derived from the Greek *Kataphraktos*, i.e., covered from head to foot in armour. “Mixed armament is defective,” perhaps so; but the Poles in many a famous battle have given practical proof that the contrary is the case. Trite maxims are not infallible. Moreover, unlike the laws of the Medes and Persians they are subject to change; if not in the wording, certainly in the truth of the sentiment they convey. The Polish cavalry (notwithstanding their mixed armament, theoretically so disadvantageous), whether for bravery in the field, or skill in the use of arms, have never been surpassed, and but seldom equalled. Napoleon held that the Poles and Cossacks were the best light cavalry in Europe. On reflection, therefore, it cannot be deemed absurd or fallacious to recommend that the lancer should revert to his original armament. But whether all light cavalry should be armed as the Poles were, is another question.

say—"The light cavalry was also composed of Polish noblemen, but the Tartars, whom a grand Duke of Luthuania had received into his State during the conquests of Tamerlane, were admitted on an equal footing both as officers and privates. They wore no defensive armour, but in other respects were equipped like the heavy cavalry, only in a less costly manner. One of their first leaders was a Luthianian nobleman named Huland, whence the term hulan or uhlan, which still remains the German denomination for lancer. In 1734, Marshal Saxe employed a polk of hulans, organized in Polish fashion, but they were disbanded after the peace of Aix-la-Chapelle." Now, when it is reflected that these Polish lancers have since become the model of all the lancers in Europe, as regards dress and equipment, the thought naturally presents itself—Why was the orginal armament altered, and the lance given to the rear rank? It must be confessed that this riddle is hard to solve, and so it will be safe to conclude that the lance in the hands of rear rank men has some occult virtue which necessitates its retention. Be this as it may, it is certain, that since the Franco-Prussian war, the Prussian cuirassiers and lancers, which before and during the commencement of the war had only pistols, have now received carbines for the rear rank. They found by experience that the maxim which forbids the arming of a regiment in a specific manner, for specific employ, cannot be set aside with impunity, for the occasion may never present itself for which it was particularly destined.* A regiment should be armed and equipped in such a manner that it can act more or less in every kind of ground, and under all the diversified conditions of war, and not in a few only. Speciality, as opposed to generality, can only succeed when allowed to choose the time and scene of action: now this is very seldom possible, hence the latter quality is the more useful.

It is curious to note that one of the after-results of the Franco-Prussian war, as regards cavalry, is that the Austrian and Prussian lancers have reverted to the original armament of the uhlan. Potier, in his *Dictionnaire Militaire*, gives an account of these famous soldiers as follow:—"In the war of 1741, the Saxons had a corps composed of ulhans; they were of noble birth and were armed with lances. Each of them was accompanied by a mounted servant or follower, armed with a musquetoon.† These men composed the second or rear rank, and acted as skirmishers and foragers for the corps." *Nihil sub sole novi* is as true an adage now as it was in the days of Solomon.

In conclusion, it may be observed that this paper does not pretend to originality; on the contrary, it was found necessary, in order to do

* During the Franco-Prussian war, in the defiles of the Vosges, whole squadrons of cuirassiers and uhlans were detained by a few men; the same thing happened on the Loire and in Brittany. The uhlans found that until they procured chassepots and used them dismounted they received constant checks, and moreover had to be protected by hussars and dragoons who were armed with carbines. Boguslawski notes this, and is of opinion that lancers should have a proportion of carbines. This proposition has been carried out, both in the Prussian and Austrian armies.

† These men were called Pacholeks, and were armed as dragoons, with fusil and sabre.

the subject sufficient justice, to make it a mere compilation; hence there will be no difficulty in making a proper distinction between *ascertained fact* and *personal opinion*. Such was the case with the famous Council instituted in Athens about 1507 B. C., called "The Areopagitæ," which is said to have heard causes only in the dark because the judges were blind to all but facts. Hence arose the most just and impartial decisions. Further, the misapplication of *a priori* arguments has carefully been avoided as much as possible during the inquiry which it was proposed to make in the beginning of the paper. It is laid down by competent authority that the only argument admissible in the art of war is "an inductive one, drawn from the facts which military history records;" or, to put it more correctly, an argument inductive from victory, deductive from defeat. It has been our object to comply with this rule; hence it is to be hoped that the following lines from *Faust* will not apply:—

Your theorist is like a beast
On a dry heath, whom a bad spirit
In one dull circle, round and round
Keeps whirling.

IV.

NOTES ON PROFESSIONAL TRAINING.

Do officers give the study to their profession that other professional men do ? Are they as well acquainted with their profession as Doctors are with theirs ? These are questions that naturally arise when thinking over the profession of arms, and I fear the answer must be given. No.

I do not for one minute mean to say that there are not as many officers as highly skilled in their profession as there are Medical men in theirs, but that officers generally are less acquainted with their profession than medical men, or other professional men are.

Having answered no the next question is, is there a remedy, and how is it to be accomplished.

In place of following these questions in detail we will compare the profession of Medicine with that of arms, being as well suited for comparison as any other profession. A man before he can practise as a Doctor must be fully qualified to do so by several years of study, after which his studies are kept fresh in his memory by his daily practice, and more knowledge acquired by experience. Now, from the constitution of an army it is not considered necessary to qualify a man in the same way, so he is admitted into the army with the general education of a boy of eighteen years, there to acquire his profession by reading and experience. But it may be questioned whether it would not be for the good of the army if a certain number of men with an University M. A. degree, and a Staff College Certificate, should not be admitted into the army as Captains, thus being qualified for the profession of arms as men are qualified for all other professions. Their education and their knowledge of men and of the world would be considerably better than that of officers of an equal age in the army. The advancement in Rank for College qualifications as given in the Prussian army is somewhat analogous to this. We have said that an officer is admitted into the army, there to acquire his profession by experience and reading, and as long as he is qualified to discharge the duties of the rank he holds, he is supposed to have so far acquired the science of his profession. It is here that the mistake lies. An officer of twenty six to thirty years of age ought to have as perfect a knowledge of his profession as a Doctor has when he begins the practice of Medicine, thereafter to be perfected by experience and not merely a knowledge of the duties of his rank. A Doctor has his daily patients to confirm and enlarge his teaching, and the soldier only his war, once in ten or twenty years wherein to gain his experience, but he has his books on wars to teach him, and these he ought to know, and be able to act upon their teaching as well when war breaks out, as a Doctor knows to prescribe from his reading when he sits down beside his patient. It is this Rank qualification, and the remoteness of ever being called upon to be a principal mover in the thinking part of a war that causes officers to

neglect the study of their profession. Now, can officers be induced to work up their profession otherwise than by actual practice, war, which practice alone, will never make an officer. Yes, by a more extended and careful training, and by insisting on all knowing the science of their profession, the interior economy of armies, as well as the routine duty of their rank, at 27 years of age. If an officer does not possess this knowledge at 27 years of age he is never likely to possess it, and he should possess it thus early to be able to gain by experience. As to the training of young officers and all officers the ordinary parades should be extended.

1st. By every staff office having its two or three assistants, who could easily be spared for so many hours daily from their Regimental duties to attend office, and who becoming acquainted with their duties would see the necessity of study. These officers being on their trial would not be likely to let out office secrets. Such a reserve would be most useful on its being necessary to extend the army staff, also to fill vacancies caused by retirements after the five years tour of service.

2nd. By officers Commanding Brigades appointing Majors and Captains to command it on parade, and subalterns to act as Brigade Majors. At first it might be necessary to have Volunteers for those duties, as many know they are not qualified for them, and do not qualify themselves for them till the duty is thrust on them by promotion. By making officers reconnoitre certain positions and draw up troops for its defence, to scale, on paper, and others having been furnished with those plans and having reconnoitred the ground to draw up an attack on it, to scale, on paper. Those plans to be submitted for written report to qualified officers in the station, or to those who think themselves qualified. It would be rather a mistake, to ask the officer Commanding the Brigade, to do more than give his opinion on the report of the judges, for as a rule they have little patience for such things, being wearied by long service, or disbelieving in their utility.

3rd. By officers Commanding Regiments detaching officers and their companies to fortify a certain part of a supposed position : to trace out with Cords the line of defence of a village, or of a given number of Barracks ; to throw a plank Bridge over a nulla. with their companies, and such like duties. Reports upon those duties to be made as recommended for Brigades, and for the same reasons.

Undoubtedly the Garrison Course will act as a first rate fillip to awaken officers to their duty, but practises such as the above might be followed to further stimulate and improve them. Too often I fear the instruction of the Garrison Course goes in at one ear and out at the other from want of practice.

G. LOGAN, *Captain*
Wing Officer
7th Bengal Infantry

V.

THE RUSSO-TURKISH WAR OF 1877 IN ASIA MINOR.

(Translated from the "Militar Wochenblatt" No. 54.)

BY CAPTAIN ELIAS 59TH REGIMENT.

PART I.

When in the course of the Summer of 1876, it began to be more and more apparent that the Eastern question would not be peacefully arranged, an order was sent to Grand Duke Michael, Governor of the Caucasus, to keep together the troops then concentrated in Camps on the borders of Asiatic Turkey instead of sending them back to their garrisons, frequently very remote. A large portion of the army of the Caucasus, therefore, was doomed to pass the autumn and winter in Camps and crowded cantonments; what wonder then that these men should long for the day which should relieve them from this unenviable position, and give them an opportunity of adding new laurels to the old fame of the army of the Caucasus.

On the 24th April the wished for hour at length arrived, and seldom has an order been received with greater enthusiasm than the following from Grand Duke Michael.

" Soldiers of the Army of the Caucasus ! The sovereign will of H. M. the Emperor calls upon you to stand to your arms for the defence and honour of our Fatherland. At your backs is the ancient fame of the troops of the Caucasus ; before you the fields and fortresses covered with the blood of your fathers and brothers. Forward ! With God for our homes and the Great Emperor."

The troops destined for the Campaign were divided into two distinct parts, viz : the Rion detachment (River Rioni,) and the corps of operations. The former, on the extreme right was to hold in check the Turkish army under Hassan Pacha (which far outnumbered the Rion detachment), and to prevent it from taking the offensive towards Poti, or from sending any large detachments in the direction of Ardahan. The corps of operations, under General Loris-Melikoff was to make a direct offensive movement against Kars. It was plain that this fortress, which the Turks had of late years improved and armed, so as to fulfil the requirements of modern warfare, and which was strongly garrisoned, could only be taken by a regular siege ; but the Turks could considerably annoy the besiegers by bringing up troops from Erzeroum, from Ardahan and from Kara Kilissa. As long as Ardahan remained in their hands, and Batoum was not seriously threatened, even part of Hassan Pacha's army might be brought up to raise the siege. General Loris-Melikoff therefore determined, before proceeding to a formal siege, to drive back the enemy's troops which were stationed North and South of Kars, and, if possible, to capture Ardahan either by surprise or by a forcible attack.

— that the Turks had
men, on Lake
were supposed
in Ardahan 14

... he knew of the
three columns, the
... B. but were ap-

Major General
Chief of Engineers

1 Staff Colonel

Muslemen.

- 80 -

ANSWER

Chief of Staff

1000000\$

Digitized by srujanika@gmail.com

41st Infantry division	...	16 battalions
2nd Brigade 19th Infantry division...	8	"
2 Battalions Rifles	...	2
1 Battalion Sappers	...	1
		27 Battalions.

Some Cossacks, horse and foot.

BEGINNING OF THE OPERATIONS UP TO THE INVESTMENT OF KARS.

I. Corps of operations.

A. Centre.

On the European side, weeks went by after the declaration of war before the armies came in contact ; but in Asia battles of more or less importance followed each other in quick succession. Here the outposts had stood for months within range of, and facing each other, on the frontier, and as soon as the Russian columns crossed it the fighting began.

On the 24th April General Loris-Melikoff, with the centre of his corps of operations, passed the frontier river Arpa-tschai ; the infantry and field artillery, by 2 trestle bridges made by the Engineers, one at Alexandropol, the other at Bayandur* (10 Kilometres S. of Alexandropol) ; the cavalry and Cossack batteries, by several fords.

The advanced parties of the cavalry brought the declaration of war to the Turkish advanced posts ; the latter, taken by surprise gave themselves up as prisoners. The only resistance was made near the village of Djelab-Kitschut; 15 Kilometres N. of Alexandropol by a Turkish dragoon post, which however surrendered after losing one cossack. Advancing further, the dragoon regiment of Nijnj-Novgorod came upon 60 armed inhabitants near the village of Tichuiss, who hastily retired on seeing the hostile horsemen. Altogether 6 officers and 96 men of the Turkish regular troops with their arms and horses were taken prisoners.

In the evening the Russian cavalry encamped on the Kars-tschai. The infantry and artillery followed by two roads, and without having to fight, reached Molla Mussa, 7 Klm : from Alexandropol, and Tichniss, 8 Klm : from Bayandur.

On the following day General Loris-Melikoff, with the infantry columns reached the Kars-tschai at Kisyl-Tschachtschach (19 Klm :

* The Bayandur bridge, made in 2½ hours was more than 87 metres long, and built on the Kappel system.

It was known at the Russian Head Quarters, that the Turks had in Bayazid, Kars, Ardahan and Batoum about, 37,000 men, on Lake Van about 20,000, in Erzeroum about 20,000. In Kars were supposed to be 21 battalions, 9 squadrons and 8 batteries; in Ardahan 14 battalions and in Batoum 31 battalions.

In order to carry out his object, and from what he knew of the enemy, General Loris-Melikoff divided his corps into three columns, the component parts of which are not yet exactly known, but were approximately as follows:

General Loris-Melikoff Commanding, Chief of Staff Major General Duchowski, Chief of Artillery Major General Gubski, Chief of Engineers Colonel Bulmering.

RIGHT WING AT ACHALKALAKI.

Lieutenant General Dewel Commanding, Chief of Staff Colonel Makjajew.

- 2. Regiments Infantry.
- 1. Battalion Sappers.
- 3. Regiments Cossacks, and some irregular horsemen.
- 1. Cossack horse artillery battery.

CENTRE AT ALEXANDROPOLO.

Commanded by General Loris-Melikoff in person.
 Grenadier Division ... 16 battalions.
 1st Brigade 19th Infantry Division... 8 "
 1 Battalion Sappers ... 1 "

25 battalions.

(Afterwards 2 more regiments were added)
 Caucasus Cavalry Division 16 squadrons.
 Combined Caucasus Cossack Division 22 Sotnias.
 Brigade of Irregular Daghestan Cavalry.
 Regiment of Irregular Alexandropol Cavalry.
 A few other Cossack and irregular regiments.

LEFT WING AT ERIVAN.

Lieutenant General Tergukassow Commanding, Chief of Staff Colonel Filipow.

38th Infantry Division ... 16 battalions.
 Some Cossack and irregular Cavalry regiments.
 To the Rion Detachment belonged : Lieutenant General Oklobjio Commanding Chief of Staff Colonel Kasbek.

41st Infantry division	...	16 battalions
2nd Brigade 19th Infantry division...	8	"
2 Battalions Rifles	...	2
1 Battalion Sappers	...	1

27 Battalions.

Some Cossacks, horse and foot.

BEGINNING OF THE OPERATIONS UP TO THE INVESTMENT OF KARS.

I. Corps of operations.

A. Centre.

On the European side, weeks went by after the declaration of war before the armies came in contact ; but in Asia battles of more or less importance followed each other in quick succession. Here the outposts had stood for months within range of, and facing each other, on the frontier, and as soon as the Russian columns crossed it the fighting began.

On the 24th April General Loris-Melikoff, with the centre of his corps of operations, passed the frontier river Arpa-tschai ; the infantry and field artillery, by 2 trestle bridges made by the Engineers, one at Alexandropol, the other at Bayandur* (10 Kilometres S. of Alexandropol) ; the cavalry and Cossack batteries, by several fords.

The advanced parties of the cavalry brought the declaration of war to the Turkish advanced posts ; the latter, taken by surprise gave themselves up as prisoners. The only resistance was made near the village of Djelab-Kitschut; 15 Kilometres N. of Alexandropol by a Turkish dragoon post, which however surrendered after losing one cossack. Advancing further, the dragoon regiment of Nijnj-Novgorod came upon 60 armed inhabitants near the village of Tichniss, who hastily retired on seeing the hostile horsemen. Altogether 6 officers and 96 men of the Turkish regular troops with their arms and horses were taken prisoners.

In the evening the Russian cavalry encamped on the Kars-tschai. The infantry and artillery followed by two roads, and without having to fight, reached Molla Mussa, 7 Klm : from Alexandropol, and Tichniss, 8 Klm : from Bayandur.

On the following day General Loris-Melikoff, with the infantry columns reached the Kars-tschai at Kisyl-Tschachtschach (19 Klm :

* The Bayandur bridge, made in 2½ hours was more than 87 metres long, and built on the Kappel system.

from Alexandropol), and Argyn (16 Klm : from Bayandur). A detachment of cavalry was sent forward to Kulveran to protect the left flank, as it was rumoured that six battalions from Kars occupied Chadji-Wali; the patrols sent out from Kulveran however found the place unoccupied. The Turks had withdrawn to the fortress all the troops between Kars and the frontier.

On the 26th April, while the troops remained in camp, Colonel Bulmering threw a bridge 36 metres long over the Kars-tschai at Djemusli, on the roads to Kürjuk-Dara, 25 Klm : from Alexandropol, by which on the 27th the two infantry columns, after uniting at Kisyl-Tschachtschach, crossed the river.

The infantry advanced to Kürjuk-Dara and Poldyrwan (12 Klm : from Kisyl-Tschachtschach), the cavalry to Subotan and Chadji-Wali (15 Klm : S. W. of Kürjuk-Dara ; only the detachment in Kulveran remained stationary.

In a European war the communications have as a rule to be secured only against the enemy's soldiers ; for the inhabitants of the country seldom take part in the contest. In Asia it is different ; the fanatic natives must be taken into consideration. The Russians anticipated that, although the more settled inhabitants of the valleys could be kept quiet with comparative ease, the mountaineers might give considerable trouble by threatening the communications.

Several months before war was declared General Loris-Melikoff, himself an Armenian by birth, and well acquainted with the customs of the half savage tribes, had secured the services of a large number of Kurd and Karapach chiefs by presents, and promises that they should form part of his body-guard, certain that in the case of a victorious advance of the Russians their example would soon be followed by others, especially as these predatory gentry could carry out their own plans in their own country so much better when allied with the Russians than with the Turks. On the very day of the arrival of the Russians in Turkish territory they were joined by such crowds of Karapachs, who had only lately been armed by the Turks, that at first 1, and afterwards 3 sotnias were formed out of them ; and deserters in such numbers were expected from the ranks of the Kurds that it was designed to form separate Kurdish regiments.

The submission of the settled part of the population was also effectually secured : as soon as the Russians had crossed the frontier they issued proclamations to the inhabitants assuring them that if they continued their peaceful occupations they should be protected against any powerful rebellious tribes ; but that all goods and property of any who should leave their homes without good cause would be forfeited. This latter measure was calculated not only to prevent the people joining the enemy's ranks, but also to facilitate the subsistence of the Russian troops in the enemy's country. All necessary requisitions were to be paid in Russian paper money, and the Turkish paper

money was declared worthless ; by this means a severe blow was struck at the patriotism of the people, for their own civil authorities were in the habit of making requisitions in the most reckless manner, and without any idea of compensation.

The country people flocked to the camps with all kinds of provisions ; the priests of the Armenian villages marched in full costume far out on the roads to meet the Russian columns. The Mahomedans behaved with submissive resignation.

Notwithstanding this good disposition in the country toward the Russians, General Loris-Melikoff neglected no means of being able to suppress by force any rebellion that might break out. As a point of appui between Alexandropol and Kars the camp then occupied, Kürjuk-Dara, was fixed upon ; this place, opposite the bridge, which had been thrown over the Kars-tschai, was excellently situated for covering the communications to the rear, for establishing hospitals, a commissariat dépôt and making postal and telegraph arrangements. For the immediate security of these establishments, which were at once commenced, the place was put into a state of defence, and a garrison left there when the corps resumed its advance on the 28th April.

The main body of the centre now left the direct road to Kars and turned in a N. W. direction towards Zaim (on the Kars-tschai, 18 Klm : N. E. of Kars) in order to reach the high road from Kars to Ardahan. In the evening they reached Zaim (where the Turks had left undestroyed a strong bridge over the Kars-tschai) and the village of Jenikew.

Major General Prince Tschawtschawadse received an order, sending him with the great mass of the cavalry, for several days so far from the encampments of the infantry that any mutual support between these two arms was not to be reckoned upon for some time. The Prince, leaving all trains behind him, was to set out with 27 squadrons, some Cossacks and 16 guns from Chadji-Wali, march by Wisinkow and Magaradjik to Kanykew and reconnoitre the South side of Kars, and the roads leading from the fortress to Erzeroum.

Before the cavalry reached Kanykew, (35 Klm : from Zaim and 10 Klm : S. of Kars) after a ride of 30 Klm ; a small encounter took place between some of the Cossack and the enemy, in which the Turkish horsemen were driven back on the fortress.

In order to draw the attention of the enemy from the cavalry, and to ensure to the latter greater freedom for their reconnaissance General Loris-Melikoff sent (29 April) Colonel Lasarew with two battalions of the grenadiers towards Kars, and Lieutenant-General Heimann, with 12 battalions, also grenadiers, 40 guns and some cavalry to Chalif-Ogly (10 Klm : S. of Zaim and 15 Klm : E. of Kars).

Colonel Lasarew took up a position 6 Klm : from Kars, remained three for several hours, and then returned to camp unmolested by the

enemy. Lieutenant-General Heimann did not content himself with following the cavalry to Chalif-Ogly, but advanced next day (30th April) to Wizinkow (12 Klms: S. W. of Kars).

In the meanwhile Prince Tschawtschawadse had made (29th April) an extended reconnoissance of more than 45 Klm. to the S. and S. W. of Kars. From Soigutli he had sent forward Major General Loris Melikoff, Commander of the 1st Brigade of the Caucasian Cavalry division, to Latschigirt and Salidja (on the high road from Kars to Erzeroum,) and Colonel Malamy to Werichan, at the foot of the Soghanli-dagh (more than 50 Klms. W. of Kars.) The former, without meeting with the enemy, succeeded in destroying the telegraph communication to Erzeroum for a distance of 10 Klms.; the latter came upon a hostile column of 9 battalions, escorting the Turkish Commander-in-Chief, Mukhtar Pacha, to Bardus. A few days before the declaration of war Mukhtar Pacha with his chief of the staff had gone to Kars to inspect the fortifications, and was there surprised by the Russian advance. On the 28th April he left the fortress, taking with him the above mentioned 9 battalions, by which force therefore the original garrison was weakened, and on the following day he was overtaken by Colonel Malamy and forced to retire to Werichan.

On the 30th April the cavalry was concentrated at Kanykew, whence after a minor artillery encounter it was called in to join the infantry at Wisinkow.

Prince Tschawtschawadse had played his part with great credit; more than 100 *nizams* had fallen into his hands, and his own loss amounted to only one man killed and four wounded.

Now that the cavalry in Wisinkow was out of danger Lieutenant General Heimann with his detachment was brought in to Zaim on the 1st May; and there were also collected under his special orders the main body of the infantry, the field artillery belonging to it, 1 dragoon regiment, 2 Cossack regiments and 1 Cossack battery.

In the meanwhile the troops which had been left behind in garrison had not been inactive: under the direction of the Colonel of Engineers Bulmering, the camp had been fortified and was prepared for a determined defence against any attempt from Kars or Ardahan.

Zaim was the 2nd stage (Kürjuk-dara, the first) on the road to Alexandropol, and on it were directed part of the siege artillery and field engineer park, as well as a considerable store of provisions; from here communications were kept up with the widely separated wings, advancing in the N. and S. On the 1st May communication with the right wing was established by Colonel Makjäjew (from the right wing) with 3 Sotuias of Cossacks. On the 6th May two detachments entered Kagysman to establish communication between the centre and left wing; one from Wisinkow (Major General Loris-Melikoff with 4

squadrons and 6 sotnias,) the other from Kulpi-Parnaut * (Colonel Count Grabbe with 1 battalion, 2 field guns, and 10 sotnias. They reached Kagysman without encountering any resistance. A Turkish cavalry post, stationed there, and engaged in training Kurds, recently called to arms, fled towards the West, leaving behind them a quantity of arms and ammunition. Colonel Count Grabbe remained in occupation of Kagysman, but detached a part of his force to Major-General Loris-Melikoff. The latter returned on the 9th May to Wisinkow having made on the way extended reconnaissances towards the Soghanlidagh. Almost every day reconnaissances were made in the neighbourhood of Kars, costing but few men, in one small fight, and which resulted in the Russians gaining an intimate knowledge of the dispositions of the fortifications.

Only one reconnaissance, on the night of the 7th, led to a fight of some little importance : Major General Scheremetjew, with a dragoon regiment had crossed to the left bank of the Kars-tschai near Tschalgaur, and, advancing towards Kars, was drawn into a fight with some of the enemy's cavalry supported by 4 battalions and 1 battery ; dismounting 3 squadrons and 3 sotnias, he succeeded at first in pushing back the enemy, and began a retreat towards the Berdyk-Tschaï (a river running into the Kars-Tschaï, 10 Klms. N. of the fortress.) During the fight however the Turks had taken up a flank position with the 4 battalions and the battery, under whose fire the Russians had to retreat; nevertheless their loss amounted only to 2 officers and 8 men wounded.

As soon as Zaim was sufficiently fortified to secure the camp, even when occupied by small numbers, against a sortie from Kars, General Loris-Melikoff resolved to send some of the troops of the centre to the right wing, in order to capture Ardahan before moving to the formal siege of Kars. For this reinforcement of the right wing was destined Lieutenant General Heimann, with 2 grenadier regiments, part of a Sapper battalion, 3 field batteries, 2 squadrons of dragoons, one Cossack regiment and half a Cossack battery.

It will be seen that great importance was attached to this expedition from the fact that the commander of the corps accompanied the column, with the intention of commanding in person in Ardahan.

When Lieutenant General Heimann marched, on the 12th May, Major General Komarow assumed command of the camp ; his orders were to deceive the enemy as much as possible with regard to the small force now left before Kars, to occupy his attention and to make further reconnaissances.

Colonel Jessakow at Djelaus † with 2 squadrons, 5 sotnias and 2 guns formed a connecting link with the detachment marching on Ardahan.

* Both these places are S. of the Aras, on the Russian frontier.

† Djelaus, 9 Klms. N. W. of Zaim.

Major General Komarow, according to his orders made many reconnaissances, one of which on the 16th led to a sanguinary engagement: he had taken up a position 6 Klms. from Fort Karadagh, with a grenadier regiment, 1 combined battalion, 2 batteries, the irregular Daghestan cavalry brigade, the Alexandropol cavalry regiment and a Karapach sotnia. In rear of the combined battalion, which was in skirmishing order, stood the grenadier regiment in company columns; the artillery was placed between the battalions and on each flank was 1 sotnia.

For a long while the hostile troops lay inactive facing each other, and the fight did not begin till Major General Komarow sent 9 sotnias to drive in some cattle grazing between Forts Karadagh and Chafis-Pacha. Scarcely had the 3 foremost sotnias got near the forts, when a Turkish dragoon regiment which had only arrived in Kars that day, came rushing down on them from fort No. 3 (Chafis-Pacha) and drove them back towards Chalif-Ogly. Major General Prince Tschelokajew with the reserve, i. e., the 2nd Daghestan cavalry regiment reinforced by 2 sotnias, attacked the Turkish dragoons in flank. The fight was for a long while uncertain, and, on the advance of 8 Turkish battalions and some batteries, appeared to be growing to such dimensions that Major General Komarow sent with all haste to Zaim for reinforcements, when two Cossack regiments which had been stationed in Chalif-Ogly to guard the line of retreat, hearing the roar of the guns, hastened on to the field and made such an energetic attack on the enemy's cavalry, which up till then appeared to be getting the best of it, that the latter were forced to retreat. The Turkish infantry then also retired, under the protection of the forts.

As Prince Tschelokajew was collecting his diminished brigade (the Daghestan brigade) which had suffered a loss of

1 officer and 20 men killed
and 4 " " 54 " wounded

he received a wound from a spent ball, from the effects of which he died on the 23rd May at Zaim.

About 5 o'clock in the evening Major General Komarow returned to the camp at Zaim, and a few days afterwards gave up his command to General Loris-Melikoff, who, after the storming of Ardahan had hastened back to the centre column to conduct the siege of Kars in person.

PART II.

The right wing of the corps, marching, as already mentioned, on Ardahan, came upon much more difficult country than the centre in its advance on Kars.

Although this right wing, under Lieutenant General Dewel (with Colonel Makjajew as chief of the staff) and consisting of 8 battalions,

14 sotnias, 24 field, and 6 horse artillery guns had received the official designation of "Achalzych detachment," it was nevertheless concentrated in such good time at Achalkalaki as to be able to advance from there on the 24th April.

The road from Achalkalaki to Ardahan passes by Karsach over the ridge of the Tschaldyr (about 2,135 metres high), which was still covered with deep snow, and then leads along the right bank of the Kurtschai to the fortress. The distance from Achalkalaki to Ardahan is about 100 Klms., half of which is on Russian territory,

On the 28th April, after very hard marching in very bad weather, Lieutenant General Dewel reached Bagrjachotun, 60 Klms. from Achalkalaki, and sent forward 2 Cossack regiments and 2 Cossack guns, which had until then formed the advanced guard, to Tschagestan on the Kur-tschai, and on their right flank. Here also the inhabitants as a rule offered no resistance, and willingly gave over to the Russians, guns and material abandoned by the Turks. The enemy's fortress being so near, a further advance appeared unadvisable, so General Dewel resolved to make a temporary halt at Bagrjachotun, in order to draw to him the siege guns and artillery park, which had not been able to come on so quickly, to make arrangements for feeding the troops, to look to his line of retreat and communications with the centre, and above all to reconnoitre the works of Ardahan.

On the 1st May Major Josseliani, with 75 irregular horsemen, and Colonel Makjajew, with 3 sotnias, were despatched in a Southerly direction to establish communication with the centre; a few of the enemy's cavalry offered some resistance, but were soon driven back, and the same day, after a ride of about 64 Klms. both detachments arrived at Zaim, where they found the Head-quarters of General (General-Adjutant) Loris-Melikoff.

The roads leading from Ardahan, and Oltsek (10 Klms. E. of Ardahan, on the way to Achalkalaki) to Kars were occupied by sotnias of Cossacks.

On the 7th May as Hassan Pacha, the commandant of Ardahan, accompanied by a large following, was riding to the village of Ur ($4\frac{1}{2}$ Klms. N. of Oltsek on the Kur) to reconnoitre the Russian position, Prince Nakaschidse, with 20 volunteers from the irregulars, swam the swift stream a little lower down, fell upon the train of the Pacha, captured an engineer officer, and killed two Turks. In the mean time the Russians had made a most careful reconnaissance of the fortress, and saw that it was impossible to take it with so small a force as the right wing alone. Whether General Loris-Melikoff, in making the plan of operations, had designed to reinforce the right wing with troops from the centre, or had greatly under-estimated the strength of Ardahan, is at present not quite clear; at all events on hearing from General Dewel he thought it necessary to detach on the 10th May against Ardahan Lieutenant General Heimann with a strong force, viz: 8 infantry batta-

lions, 2 squadrons, 4-6 sotnias, 24 field and 3 horse artillery guns from Zaim.

Ardahan is situated on both sides of the Kur-tschai on an elevated and remarkably fertile plain about 1,650 metres high, 18 Klms. long and 12 Klms. broad. Passable roads lead from the town to Batoum, Akhaltsich, Kars and Olta-Erzeroum. The fortifications formerly consisted of the citadel, and wall round the town ; but a few years ago, in consideration of its great strategical importance, the town was thoroughly fortified at a very considerable outlay. The fortress was surrounded by a cordon of detached forts, in which it was found necessary to include two heights $3\frac{1}{2}$ and $5\frac{1}{2}$ Klms. from the town, whence the inner zone of forts and the town could be seen into ; so that altogether a very large extent of ground is covered. The character of the works is essentially that of permanent fortifications : deep ditches are cut in the rocky ground, strong ramparts erected, and in the forts bombproof covering for the whole garrison. The platforms for the heavy guns are of stone, those for the lighter ones, of wood. Still many of the works bore the stamp of incompleteness ; sometimes part of a wall was wanting, sometimes even the armament of works, on some front not considered likely to be chosen as a point of attack.

Forts Kudian and Kaja-baschi form the inner defences of Ardahan on the left bank of the Kur-tschai ; the former of these was not completely armed and equipped. From Fort Kudian, between the Kur and the road to Batoum, both the river and the road are under fire for a considerable distance. Fort Kaja-baschi commands the Eastern slope of the Maglass hill, on the top of which stands Fort Ramasan, and also the valley through which wind the Achalzych and Achalkalaki roads. Strange to say the bridges over the Kur,—at any rate 2 of them—do not come under the fire of the fort, so that for their defence it was necessary to make shelter trenches on the steep slope down to the river. Kaja-baschi is formed on three bastioned fronts, with several flèches thrown out in front ; the parapet is 6-10 metres thick ; there are 20 guns (6 Krupps mounted on high iron carriages, 6 rifled breach-loaders, 2 6-inch rifled muzzle-loaders, 3 S. B. mortars, 1 S. B. and 2 field-guns.

Just before the commencement of the siege the Turks had begun to join Forts Kudian and Kaja-baschi by a rampart, in order to protect an encampment of several battalions between the forts from a bombardment from the North, from which direction the enemy was expected.

Notwithstanding that the citadel on the left bank, and N. E. of the town is utterly unsuited for defence, and, since the late improvements in artillery, has lost all military importance, yet 14 guns (among them a Krupp) were left in it.

On the heights 1,600 metres E of the town, on the right bank of the river, and separated from the heights of Gelja-Werdy and Alagos by a deep valley, are Forts Kastapassi and Singer, placed so as to

command the ground as far as Emir-Ogly and Gurdjibek : height of parapet 8 metres, thickness 10 metres, and very deep ditches ; armed with 17 guns (2 Krupps, 3 rifled breach-loaders, 5 rifled muzzle-loaders and 7 S. B. mortars.

Between these forts and the town is Fort Achali, which may be looked upon as a bridge-head for the two bridges to the Eastward. This fort is of very strong profile, has a deep ditch, and mounts 5 guns.

The cordon is closed by Forts Djus and Mechrab, of construction similar to fort Achali, and armed with 9 guns (3 Krupps, 4 rifled breach-loaders and 2 rifled muzzle-loaders). Fort Mechrab, right on the bank of the Kur, forms a bridge-head for the Western bridge.

The garrison had filled up the gaps between Forts Singer, Achali and Djus with parapets and shelter trenches.

In March and April of this year, by the advice of English engineers, the fortifications at Amir-Ogly were built, on the heights of Galja-Werdy $5\frac{1}{2}$ Klms. E. of Ardahan ; from here the roads to Achalkalaki and Kars are commanded for a long distance. The principal work is a redoubt, with a rampart not very high, but 7 metres thick, and surrounded by a ditch 4 metres broad and 2 metres deep ; several lunettes are thrown out about 800 metres S. E. of the redoubt ; and on the Eastern slope, shelter trenches, in tiers, one above the other. The redoubt carries 10 guns, among which are 4 heavy breach-loaders and 2 mortars.

In like manner, on the left bank of the Kur, Fort Ramasan is pushed forward to the hill Maglass, about $3\frac{1}{2}$ Klm. from the town, so as to bring under fire the heights to the North, and the road to Achalzych, more effectually than could be done from Fort Kaja-baschi ; but the fort, being itself commanded from the Northern heights, had to be made unusually strong. In front of a parapet more than 7 metres thick are a deep ditch and glacis ; further to the front, and on both sides of the fort, are gun emplacements and batteries, cut in the rock ; the gorge is closed by a barrack, defensible by infantry fire. On the ramparts were 13 guns (among them 5 mortars.)

Even the united columns of Generals Dewel and Heimann saw before them anything but an easy task to reduce a fortress so strong, so well armed, and defended by such a powerful garrison.

General Heimann, who had marched from Zaim on the 10th May, reached Djelaus the same day Tschatach on the 11th, Chaskew on the 12th and on the 13th Pankiss ($5\frac{1}{2}$ Klms. S. of Oltschek and 13 Klms. from Bagrjachotun, the camp of General Dewel.) The tactical communication with the right wing being now established, General Loris-Melikoff assumed command of the whole of the troops concentrated about Ardahan, reconnoitred in person the outworks on the East, and at a council of war gave out the plan of attack. General Dewel was

to begin by storming the heights of Gelja-Werdy, and then from here, and from the South, conjointly with General Heimann, to proceed to the storming of the fortress.

On the 14th May, in accordance with this plan, General, Heimann moved to Gurdjibek, ($2\frac{1}{2}$ Kms. S. E. of Ardahan). His detachment, having the lion's share of the work, was strengthened by a force from the right wing, viz : 2 battalions infantry, 3 companies sappers, 1 battery artillery and 1 sotnia ; so that there remained with General Dewel only 6 battalions infantry, 1 company sappers, $3\frac{1}{2}$ batteries, and 2 regiments of Cossacks.

On the following day General Loris-Melikoff had the siege guns from Bagrjachotun brought up to the left of the position at Gurdjibek and Bulinering, Colonel of engineers, fixed the sites of batteries, to be built in the night.

For the 16th May, besides the erection of batteries, it was specially ordered that General Heimann was to bombard (with these batteries) the fortress and the heights of Galja-Werdy ; General Dewel was to be in a position to take Fort Emir-Ogly, should opportunity offer ; in case there should be no time to communicate with the Corps Commander, General Dewel was to choose his own time for making the attack ; but he was to take care and warn (with rockets) the troops stationed opposite the South front of the fort, so that the fire of their batteries might be directed elsewhere.

As soon as it was dark, the sappers, assisted by workmen sent from different regiments, set to work on the batteries ; the arrangements had been made with such circumspection, that at daybreak nearly all of them were finished and armed. They were equipped as follows :

Nos. 1, 2, 3, and 4, each with 4 9-pounders.

- „ 5 and 6 with 4 9 pounder siege guns, and 3 6-Zoll * mortars.
- „ 7 with 4 9-pounders.
- „ 8 „ 2 6-Zoll mortars.
- „ 9 „ 6 9-pounders.
- „ 10 11 with 4 9-pounders.

They were somewhat behindhand with the armament of Nos. 5 and 6, which were on a very steep slope, and great difficulty was experienced in getting the mortars up ; even the 9 pounders required a double team of horses, and were then only got up with a great expenditure of time and strength.

At 8 a. m. the other batteries opened fire, and were joined by Nos. 5 and 6 in the course of the morning. Batteries 1-5 directed their fire on the heights of Galja-Werdy ; Nos. 6 and 11, on the forts immediately South of the town, and on the town itself.

* A Zoll=about 1,037 inch.

Although Fort Emir-Ogly, towards which General Dewel was ready on the march, was bombarded by 5 batteries a constant fire was returned, and it could not be silenced. The commander of the fort was Colonel Castar Beg, a particularly brave and able officer, who already, by his arrangements for the defence of Ardahan, had won the confidence of his garrison.

Several hours before the bombardment began, General Dewel had arrived in the positions from which he designed to march to his perilous enterprise. His troops were placed as follows :—

Colonel Amiradjibow with 3½ battalions of infantry, 4 field, and 3 Cossack guns 2 Klms. E of the fort Gelja-Werdy ; Colonel Makjajew, with 2 companies infantry and 4 guns to the left of Colonel Amiradjibow, and on a hill from which the shelter trenches in front of Emir-Ogly, and a camp on a height, covered by 2 battalions and 1 mountain battery, could be bombarded. 2 sotnias and 3 Cossack guns, to protect the left flank, on the Achalkalaki road.

Major General Oreus, with 1 battalion infantry, 4 guns and a regiment of Cossacks, was to cross the Kur-tschai at the village of Ur, and make a demonstration against Ramasan.

One battalion of infantry, 1 company of sappers and 4 guns formed the reserve.

The men had left their great coats and Knapsacks behind them in camp, and carried in their havresacks only a ration of biscuit and bacon.

At 6-30 a. m. General Dewel, who remained with Amiradjibow's detachment, caused this detachment to fall in, and at the same time Colonel Makjajew's party opened fire with such precision, at a distance of 3,360 metres, that the tents speedily disappeared, and the mountain battery was silenced. Colonel Amiradjibow formed 2 of his battalions in company columns, protecting each flank of this advanced line by a company of rifles, and he kept 4 companies in reserve. In this formation he advanced to the foot of the slope, nearly 1½ Klms. from the bottom to the top, and held by an enemy of more than double his strength, protected by shelter trenches one above another and by the works of the fort. By about 10 o'clock the nearest slopes were taken ; after allowing the men a few minutes rest, Amiradjibow stormed the camp, and drove the enemy out of it. But the hardest part of his work was yet to come 600 paces from the camp was Fort Emir-Ogly with half of its guns directed against the already reduced battalions, and at the same time the garrison (4 battalions) opened a tremendous small-arm fire upon them. General Dewel, who had accompanied the column up the slope, at once saw that the troops could not long stand against such a fire, so that they must soon be led to the assault of Emir-Ogly ; or all efforts, all losses would be in vain. The artillery must prepare the way ; but scarcely had the Cossack guns, which alone had been able to follow the

column, come into action, than one of them, before it could fire a shot, had lost the whole of its men and horses. The guns had to be withdrawn.

Fortunately Emir-Ogly had in the meantime suffered so severely from the fire of the other batteries, that part of the garrison now withdrew into the town, and the fire became less lively. But the Russian field guns, although without their limbers, had now arrived, and at about $\frac{1}{2}$ to 1 o'clock all the guns were brought up to the front. After firing a few shots, General Dewel advanced to the assault, and by 1 o'clock the Russians held the works. The horsemen of General Loris-Melikoff's escort fell upon the flying masses, scattering them in all directions.

When General Melikoff was informed, about noon, that General Dewel had taken the camp, and that he further intended storming Emir-Ogly, he ordered General Heimann to support the assault by a demonstration from the South, so as to draw upon himself the attention of the garrison ; but the detachment sent for this purpose found the fort already taken.

With a loss of 20 men killed, 4 officers and 94 men wounded General Dewel had not only beaten a far larger force than his own, but had also taken a permanent fortification, which commanded all the other works of Ardahan except Fort Ramasan. The victors found in Emir-Ogly many small-arms and cartridge boxes, and much powder and ammunition.

General Melikoff, unwilling to spoil this great success by any foolhardy impetuosity against the other forts, stopped the fighting for this day, and determined to make all further attacks with befitting preparation. Leaving one battalion to garrison the captured fort, he ordered the remainder to retire to their former camping ground, and resolved to bring the batteries nearer to the enemy's works, and bombard the other forts and the town on the following day, (with the exception of Fort Ramasan, from which no fire could be directed on the town); then on the 18th to give the assault when the courage and endurance of the garrison should be shaken.

According to the orders for the 17th Major General Dewel was to cross to the left bank of the Kur-tschai, and make a demonstration against fort Ramasan. General Heimann, with a regiment of grenadiers 1 line regiment, and 2 batteries of artillery, was to occupy the heights, of Gelja-Werdy ; Major General Duchowsky, with the Tiflis grenadier regiment and the seige artillery, was to take position South of the fortress on the heights of Alagos; and Major General Scheremetjew, with the cavalry, resting on the Kur, was to cover Duchowski's left flank. A large General reserve did not appear to be required.

The enemy, remaining, as he did, inactive behind his parapets, the Russians were able to carry on the erection of their advanced batteries even in the day time, and to open fire therefrom by 3 in the afternoon

which told with such effect, that soon great uneasiness was visible in the works, and part of the enemy's troops crossed from the right to the left bank of the Kur-tschai in great disorder.

Seeing the success which had hitherto attended the Russians, it now became a question whether, notwithstanding the rather late hour of the day, the assault on Ardahan might not be attempted; and as General Melikoff sent an officer to General Heimaun with a proposal to this effect, another officer came from General Heimann to General, Melikoff with the same proposal.

It was decided to give the assault.

General Melikoff ordered :—General Heimann against Forts Kastapassi and Singer, General Duchowski against Forts Djus and Mechrab, both to begin their advance at 6 o'clock.

General Heimann led forward his troops in two columns, covered by the numerous water courses and ravines, and unseen by the enemy; he passed the level ground between the heights of Gelja-Werdy and Singer in open order, and established himself quite near the fort of the latter name ; allowing his troops a few minutes to shake the garrison with their rapid small-arm fire, he gave his word "Forward," and his men rushed up to the fort ; the enemy, already disorgainsed by former losses, lost all presence of mind, fired a few random shots, and fled to the town.

South of the town also the Russians had been victorious : General Duchouski sent the 2nd battalion of the Tiflis Grenadier regiment in thick lines of skirnishers, and supported by the 3rd Sapper battalion against Achali, and another battalion (same regiment) in similar formation, against the group of fortresses Djus-Mechrab. Here also the works were taken at the first onset ; and here also the victorious Russians pursued the flying enemy into the town, inflicting on him enormous losses in the narrow crowded streets. In many of the houses, especially in the Pacha's palace, the fugitives made a desperate resistance, but the houses were stormed, and the hostile crowds driven with irresistible force towards the bridges. Darkness had set in, and so increased the confusion in the streets that many Turks were precipitated into the river. The discomfiture of the fugitives reached its climax when the Cossacks guns opened upon them on the bridges, and pounded them with case.

Meanwhile the Russians, in their endeavours to cut off the retreat of the Turks over the bridges, not only found themselves under a very heavy fire from the positions and works on the left bank, but they had also lost all tactical formation. The infantry of the columns had got so mixed up together in front of the bridge, that General Heimann ordered the "Sammeln" ("assemble") to sound. As soon as he had collected and formed up a couple of hundred men, he advanced at once over the bridge to attack the heights on the other side ; the enemy

did not wait for the shock, but turned and fled. By eight o'clock in the evening the battle was decided.

In spite of the darkness General Scheremetjew pursued the enemy for 5 miles, but could not come up with him, as, utterly routed and dispersed, he disappeared in the mountains.

Fort Ramasan had still remained in the hands of the Turks ; but the events of the 16th and 17th May had made such an impression, that in the night that also was abandoned, thus leaving the Russians in undisputed possession of Ardahan.

On the night of the 17th General Melikoff occupied the captured works with a grenadier regiment under Colonel Tolstoi ; and about 3 in the morning retired with the remainder of the troops to their former camping grounds.

The loss of General Heimann's column was :—

1	officer, 48 men killed
6	" 248 " wounded

of General Dewel's column :—

—	officers 20 men killed
4	" 94 " wounded

Total 11 officers 410 men

To estimate the Turkish loss, even approximately, is difficult, as but little faith can be placed in Turkish accounts. In the course of the 18th, 19th and 20th May, the Russians buried 1,750 of the enemy's corpses. Major General Ali Pacha, commandant of the forts on the left bank, had been taken prisoner, and Ahmed Aga, chief of the staff, had fallen.

The Russians found in the forts 92 guns (among them 19 6-inch and 5 24 pounders), and a quantity of small-arms, ammunition, provisions and engineer's tools.

The proverbial tenacity of the Turkish soldier on the defensive did not on this occasion prove a match for the dashing courage of the Russians ; the latter succeeded, with comparatively little loss, in taking, with 16 battalions of infantry and 65 guns (mostly field guns), a strong fortress mounting 92 guns, and further defended by 14 battalions. The result was greatly due to the judicious dispositions made by General Loris-Melikoff, who rightly discerned the weak points in the fortress. The plan, and especially the armament, of the forts showed that the Turks expected an attack only from the directions of Achalzych and Achalkalaki, i. e., from the N. and N. E. The forts on the South front were not so strong in profile as the others, and moreover were not at first fully armed ; too late the Turks began to strengthen them, to place

new batteries between them, and to join them with parapets. The completion of the work was prevented by the decision of the Russians.

In the course of a few days General Loris-Melikoff established Russian administration in the district of Ardahan, and ordered the troops under General Heimann and General Dewel to march for Zaim on the 25th May, in order to prepare for Kars a fate similar to that which had just befallen Ardahan.

Colonel Komarow, with a detachment consisting, it appears, of only 2 Cossack regiments and 1 line battalion, was left in Ardahan. He was to make bold excursions along the high road leading to Erzeroum, by Pennek and Olti, so as to threaten the left wing of the Turkish main body at Bardus; to send off the captured guns and material, either to Achalkalaki, or to the Russian Camp before Kars; and lastly to demolish the fortifications.

PART III.

C. *Left Wing.*

The object of the left wing was, as already mentioned, to prevent the Turkish troops South of Kars from raising the siege of that fortress when invested by the main body (the centre), and to drive them towards the West.

In order to raise the siege, the Turks, who were in considerable numbers in the Valley of the Murad-tschai, and on Lake Van, might either make use of the road Karakilissa—Kagisman—Kars, or, by an advance from Bayazid to Alexandropol, threaten the line of communications of the Russian centre.

Only three roads lead out of the Murad-tschai valley to the district of Erivan: the first from Bayazid over the Gernavik-tschai, past the Kurd village of Karabulak, over the Tschengel-dagh (3,245 metres high), and then down to Orgow, a post on the Russian frontier, and Igdyr, in the valley of the Aras. The second leads from Diadin through the valley of the Balyk-tschai, over a somewhat lower ridge than the one at Orgow to the Russian village Tscharuchitschi (20 Klms. N. W. of Igdyr); but the valley of the Balyk-tschai is marshy and hard to pass in rainy weather; also N. of the mountains the road leads through a very poorly watered country. The third leads from Surp—Ohannes to the Russian frontier post Abasgelski, and presents difficulties similar to those on the Diadin road. Of these the first two are passable by all arms, but the third is merely a narrow bridle path, which might, however, with a little labour soon be made practicable.

An attempt to raise the siege of Kars might be frustrated by the purely defensive measure of occupying Kagisman and the defiles on the above mentioned roads; but an offensive movement was necessary, and

it was resolved to seek out the enemy notwithstanding that this wing had really only a secondary part to play, was not very strong, and in case of a repulse could not be promptly supported by the centre.

To take the offensive in the valley of the Aras in a Westerly direction towards Kagisman was out of the question, on account of the difficulties of the ground, so that an advance could only be made by the valley of the Murad-tschai, 140 Klms., as the crow flies, from Alexandropol. In order to make use of the road through the valley of the Murad-tschai to Karakilissa it would be necessary to take Bayazid at the Eastern extremity of it, and in which lay a Turkish garrison. The occupation of Bayazid would place the Russians in communication with the Persian troops on the Turkish frontier, the negotiations for whose alliance with the Russians appeared to be reaching a satisfactory conclusion. Moreover the possession of this town would give them the power to prevent, by flying columns sent S. towards Lake Van, the gathering of hostile Kurds; and by a further advance with the main body to Karakilissa, or still further W. to Alaschgerd (Toprak-kale) to bar the only road from the S. by Kagisman to Kars.

If Kars were taken the centre could advance at once with all available forces, and would then find in the left wing a substantial support, because the road from Karakilissa to Erzeroum leads in rear of the enemy's main position, by the Soghanli passes, so that his line of retreat on Erzeroum would be seriously threatened; but this left wing was not strong, and was a long way from the main body, and had to be prepared to front both South and West; all this rendered its task very difficult, and the difficulty of course increased in proportion to the distance it moved from its base.

The left wing, or "Eriwan detachment" was composed of:

Lieut. General Tergukassow, Commanding,

Colonel Filipow, Chief of the Staff.

2 brigades of Infantry (16 battalions).

1 brigade of artillery (48 guns).

and a few cossack regiments and irregular horsemen.

General Tergukassow, whose detachment had been assembled at Igdyr began his advance on Bayazid only a few days after the main body under Loris-Melikoff had crossed the frontier. He sent forward an advanced guard which arrived at Orgow at the fort of the Tschengel-dagh on the 27th April; and at Karabulak, 6 Klms. beyond the frontier, on the 28th; this he followed up with the main body in two columns; the right marching by the Caravan road to Kudjak, on the frontier, and the left by the main road to Orgow, which the advanced guard had gone by. By next day the main body had pitched their tents on the Tschengel-dagh, which although only 14 klms. from their former camp, was only reached late in the evening, after a very hard march.

At 3 in the morning of the 13th April, Tergukassow sent from the advanced guard 2 Sotnias of Cossacks, under Colonel Filipow, to recon-

noitre towards Bayazid, about 17 Klms. off. In a village near the town Colonel Filipow found some Turkish infantry, and cavalry, outposts, but, as soon as the Cossacks showed themselves, these, as well as two battalions in the citadel, retired to the mountains S. W. of the town. Directly the Turkish troops had left Bayazid the municipal authorities sent out representatives to the Russian columns to offer an unconditional surrender of the town within two hours. In the absence of troops in Bayazid, some of the inhabitants took the opportunity of demolishing the public buildings, and robbing the sick, left behind in hospital; the municipal authorities, however, found means to suppress these irregularities without the aid of the Russian troops. General Tergukassow marched into the town on the 1st May, and lodged his advanced guard in the citadel; he appointed Colonel Kowalewski Commandant of the place, who, as president of the town council, exercised great influence on the internal administration.

The Turkish garrison, *i. e.* one battalion Nizam (800 men), one battalion Redifs (700) and 500 horsemen, under Kemali Pacha, had abandoned the citadel in such haste that 12 guns and a large quantity of provisions of all kinds were left behind.

Meanwhile the main body advanced to Arsib (or Arsab), 20 Klms. N. W. of Bayazid; the right wing to Myssun and Karum (12 Klms. S. of the frontier), and on the 8th to Diadin, which was also found unoccupied by the enemy. Here the Russians heard that two battalions under Ali Aga had been raised from the mountain population, near Lake Sary-Gol, S. W. of the Ala-dagh, in order to co-operate, with the troops who had just left Bayazid, against their communications; also towards the West parties of the enemy were discovered; General Tergukassow therefore, on the 10th May sent Colonel Filipow with 8 Sotnias to reconnoitre towards Sary-Gol, and on the 11th, Major General Prince Amilocharow with the advanced guard to Surp-Ohannes.

Colonel Filipow took the high road to Bayazid till he reached the other side of the water-parting; he then turned S. and followed the bank of the Gernavik-tschai to the village of Toparis, where he bivouacked; but, starting again at 3 in the morning, he marched towards Lake Sary-Gol by a narrow path, the only communication between Bayazid and Van. Here he heard from the inhabitants of the village Tschobankaljassy that Kemali Pacha was in the valley of the Soukssy, but nothing was to be seen of the formation of any new battalions of mountaineers. His task was therefore accomplished, and, a further advance along the steep snow covered paths being very difficult, he began his march back to Diadin at 10 in the morning, which place he reached at dusk on the 11th, having traversed in these two days more than 100 Klms., chiefly through the mountains.

On the 11th May Prince Amilocharow arrived at the Convent of Surp-Ohannes (54 Klms. W. of Bayazid), without having met with the enemy; but the following day he sent strong patrols to reconnoitre to-

wards Karakilissa (35 Klms, W. of the Convent), and these fell in with some hostile horsemen near the river Akamassian ; the latter retired in a Westerly direction before an attack of the Cossacks. On the 14th May the main body under Lieut. General Tergukassow also advanced to Surp-Ohannes, after the engineers had made the road practicable for artillery ; from here a strong detachment was sent forward on the 15th and discovered, from the heights which slope down to Karakilissa, a large encampment of the enemy. From the reconnoissances, and from information given by the inhabitants, it was ascertained that the enemy's detachments (*viz.* 2 battalions, 2 guns and 500 kurds at Karakilissa ; and 4 battalions, 4 guns at Toprak-kale) had orders to avoid any serious collision with the Russians in their advance, but to retire on Dagbar in order to further the plan of the Pacha of Van of operating with 50,000 Kurds and 8,000 Nizams against the communications of the Russians, by first drawing them further from their base. At this time Colonel Kowalewski, Commandant of Bayazid, sent word that preparations were being made for an attack on Bayazid, by 3,500 Kurds and others, from Soukssy, and Kemali Pacha with 2 battalions, 5 sotnias, 2 guns and 500 Kurds from Basit-Agi, in concert with the garrison of Van (3 battalions, 9 guns). On the 16th, therefore, Prince Amilocharow was sent with a detachment to the support of the threatened town, which he reached on the same day, notwithstanding that it is 54 Klms. from Surp-Ohannes.

For the next few days the situation was not very critical, as the enemy's detachments before attacking Bayazid were waiting for a reinforcement of 12,000 Kurds, then in course of formation. Prince Amilocharow took advantage of the enemy's indecision by making (19th May) an offensive movement against one of his columns with a view to beat them in detail.

In the meantime General Tergukassow had made Surp-Ohannes into a principal dépôt ; in the deserted halls of the Convent a hospital was established ; and all kinds of provisions, which had been bought from the inhabitants, stored up.

D. Rion detachment.

The theatre of operations of the Rion detachment is situated in the thickly wooded spurs of the Adjara-dagh, which slope steeply down nearly to the sea, leaving only a narrow tract along the shore.

At Batoum was a Turkish fleet, consisting of 2 ironclad frigates, 2 ironclad corvettes, and a steam despatch boat, which could fire on the only practicable road along the shore leading from the Caucasus to Lagistan ; so that the Russians, not being in a position to encounter the Turks, at sea, were unable to advance by this road ; the columns were obliged to march further inland, by the difficult mountain tracks, which descend into the deep valleys of the Tscholok, Ochtschamuri, Aktschua and Kintrisch, and then rise again at an equally steep incline to the snow-covered crests of the mountains.

The Rion detachment consisted of :—

Lieut General Oklobjio, Commanding.
Colonel Kasbek, Chief of the Staff.

1st Brigade 41st Inf. divn. (2 regts.) Major General Schelemetjew.

2nd do. do. do. Major General Denikow.

2nd do. 19th Inf. divn. Major General Alchasow.

2 Caucasian Rifle battalions.

1 Sapper battalion.

Altogether 27 battalions,

also a few regiments of Cossacks, and of irregular infantry and cavalry; and 9 batteries of artillery (72 guns).

On the day war was declared, 24th April, General Oklobjio had his troops collected in 3 columns: the right under Colonel Abaschidse was near Fort Nicholas; the centre, under Colonel Worotinzow, at Osurgeti; the left under Major General Denibekow at Tscholok (or Tschorok).

The right column marched in an easterly direction, following the river Tscholok (upstream) as far as the post Lill, where it passed the frontier out of range of the Turkish ships, and awaited there the arrival of the centre column, which on account of the state of the roads from recent rain had only reached Nijne-Bogil. The left column crossed the frontier at Tscholok. No enemy had as yet been seen.

On the 25th April, as the centre column was on its march to Lill a small encounter took place between an advanced party of 2 Sotnias and 1 company, and a few of the enemy who had fired on the column from the heights N. of the Ochtschamuri. After the junction of the right and centre columns at Lill, Major General Schelemetjew took command of both, and sent an advanced guard towards the valley of the Ochtschamuri, and a flank detachment (under Colonel Kasbek) of 6 companies infantry and 1 Sotnia cavalry towards the heights of Mucha-Estate, in the flank of a detachment of the enemy which had taken up a defensive position on the Ochtschamuri in order to oppose the Russian advance. After a fight which lasted several hours General Schelemetjew succeeded in driving back the Turks to the left bank of the river, and, following them, forced his way into their camp on the heights of Mucha-Estate. Meanwhile the left column had also become involved in a fight. The advanced guard under Colonel Kosekow came upon the enemy entrenched in the village of Legwa, on the left bank of the Ochtschamuri, and only succeeded in driving them back as night approached, and the pressure of Colonel Kasbek's detachment made itself felt on their left flank. A flank detachment from the left column under Prince Gurieli, Captain on the Staff, having advanced by Kakuty, on a road between 2 and 3 Klms. E. of the others, had met with armed inhabitants supported by regular troops and Bashi-bazouks, who showed such a vigorous resistance in that very difficult country, that it was only after

receiving re-inforcements from the main body that Prince Gurieli was able to break through, and, late at night, reach Legwa.

At last on the 26th April all the columns were concentrated on the heights of Mucha-Estate. In his short march from Legwa to the heights, Major General Denibekow had come across several detachments of the enemy, and had driven some of them out of the village Alambari over to the left bank of the Aktschua.

The resistance made by the inhabitants of these parts, together with the want of proper lines of retreat and communication, made it necessary to act with great care and foresight. General Oklobjio resolved therefore to remain for the present on the heights, to fortify them strongly, and either to make new lines of retreat or to improve the existing paths. The works on the heights were armed with the 9-pounders of the detachment, and a strong bridge was made over the river Ochtschamuri, which flowed past the rear of the position. But the time was rather limited for these extensive preparations. Although at first the relations with the inhabitants appeared auspicious, the influence of Edi-beg altered this, and turned them in favour of the Turkish troops, who still occupied, with about 4,000 men, a strongly entrenched position on the right bank of the Aktschua, opposite the Russian position. It was not to be expected that these two hostile forces could long stand within range, opposite each other, without coming in contact; and, as the Turks were daily receiving into their ranks crowds of volunteers, General Oklobjio determined to attack the enemy on the 11th May, and drive them back to the left bank of the Aktschua. For this offensive movement two detachments were told off: Major General Denibekow was to advance at 3-30 A. M. by Alambari, and take the village Chuzubani, on the heights; while Major General Schelemetjew was to hold the road from the camp to Tschurukssy and make a demonstration against the West end of the straggling village of Chuzubani. Each column marched by two roads: the main body of General Denibekow's detachment, i.e., the greater part of a regiment of infantry, 4 mountain guns and 50 horsemen, by a path to the right of the main road, on which marched the left flank column, i. e. 6½ companies and 2 mountain guns. General Schelemetjew with 1 battalion infantry, 2 companies rifles, 4 guns and 2 Sotnias of cavalry took the high road to Tschurukssy, while on his left flank along the Aktschua marched Major Leistet with 2 companies of rifles. As soon as the two detachments had left the camp General Oklobjio began to bombard the enemy's position with the 9-pounder batteries of the camp, and also brought up the troops which had been in rear, so that they could at any moment move to the support of one or other of the columns.

As General Denibekow's advanced guard with the 4 mountain guns entered the large wood on the banks of the Aktschua it suddenly found itself in the centre of a hot fire, under which the guns were compelled to halt for the skirmishers to surround and push back the enemy; then, in consequence of the heavy losses, and the small effect of the shots

in the wood, the guns were withdrawn from the advanced guard to the main body.

Between the two detachments, one of which was advancing South, and the other West-South-West, there was soon such a gap, that it was feared the Turks might push into it; in order to fill it up, a battalion of infantry and 1 Sotnia were despatched as quickly as possible from the camp. Scarcely had these set foot on the battle field, when General Denibekow, placing himself at the head of his column, advanced to storm the enemy's position; the latter without awaiting the attack, beat a hasty retreat to the left bank of the river.

Meanwhile General Schelemetjew had also arrived within range of the enemy's fire. Nearest the river, on the left flank, marched Major Leistet; on his right, on the main road, two companies of rifles, as advanced guard to the main body, which followed; and on the right flank the two Sotnias. The enemy had taken up a position in the dry bed of a canal, from which they poured in several volleys on the advancing Russian columns. Major Leistet, although severely wounded, led his rifles straight to the attack, and drove the enemy back to the left bank of the Aktschua. The advanced guard, inclining to the left, fronted towards the river, and halted opposite a ford, on a level with the head of the left flank column. In rear came the main body in two lines; the artillery unlimbered on a height to the left of the road. To attack the enemy's position in front seemed impossible, as he was constantly receiving re-inforcements. In order to dislodge him from a height from which the Russian position was being bombarded with only too much effect, General Schelemetjew now sent a company of rifles a few paces forward; and the rifle company on its right, seeing this movement, and thinking it was the signal for a general advance, rushed forward and actually gained the further bank, but the enemy's fire was so hot that they were obliged to seek cover as quickly as possible in the bushes in the bed of the stream.

At about 7 A. M. the Turks in their turn tried an offensive movement, by attempting to turn their adversary's right. At the same time some projectiles thrown by the Turkish ironclad fleet (about 20 shots from 6 and 9-zoll guns) fell near the reserve; but owing to the marshy ground they failed to ricochet, and only 4 men were wounded by them. At 11 o'clock the fight on this flank again began to increase; then, after a severe artillery and small-arm fire by the Russians, the enemy's fire became weaker, and General Schelemetjew seized this moment to advance to the attack with all available force. The remaining three companies of rifles now followed the one which had first attacked, to the further bank of the river, and drove back the enemy towards Kobuleti and Zichisdsiri, so that by about noon the whole of the enemy's position remained in the hands of the Russians. Still, in order to hold the position against possible attack, it was necessary to occupy the commanding height of Chuzubani; but the troops, which had been engaged since day-break were too much exhausted for this new task; so three fresh

battalions and one Sotnia were sent out from the camp, which, advancing with the bayonet, occupied Chuzubani almost without firing a shot.

The Russians had on this 11th May taken these heights, so important with regard to future operations, with a loss of 18 men killed, 10 officers and 140 men wounded.

As in the case of the Mucha-Estate heights, those of Chuzubani were fortified within the next few days, and new roads made to communicate with the depôts in rear.

To penetrate far into the enemy's country in the shortest possible time was not General Oklobjio's object; what he required was to establish a firm base of operations; the Rion detachment remained, therefore, some considerable time in the positions taken, without seeking any fresh encounters with the enemy.

R. ELIAS, *Captain,*
59th Regiment.

VI.

OBSERVATIONS ON THE INSTRUCTION OF THE GERMAN ARMY,

BY COL. BARON KAULBARS.,

FROM THE *Revue Militaire d'Etranger* No. 361,*Cavalry—INSPECTION OF SQUADRONS,**Translated by MAJOR SANFORD, R. E.*

Squadrons, like Battalions of Infantry are not all inspected by one and the same officer. Thus in the Guard one Squadron is seen by the Divisional General, another by a Brigadier, a third by the Colonel, and so on, and all these officers endeavour above all to determine which of the Squadrons, as tactical units, are fit for any emergency of war-service ; throughout the whole inspection they endeavour to test, in presence of the commanding officers, the suppleness, presence of mind, and *Savoir faire* of the troopers individually, as well as in the ranks. At the same time the Commanding Officers may verify the correctness, as regards regulations, of all the formations.

The Inspection commences with the testing of individual horsemanship, swordsmanship and so forth, when this is over the Squadron exercises begin, according to a programme fixed by the captain. No movement is made at a walk, the object is to perform all evolutions at the most rapid paces. The briskness of these movements is so great, that spectators have considerable difficulty in following the squadron, which passes from end to end of the parade ground with admirable rapidity.

The squadron hardly ever ceases to gallop, charges many times, sometimes in one direction sometimes in another, taking the jumps, sometimes in line, sometimes in column of sections. The charges are invariably terminated by the mêlée ; at the command or signal of the Captain, the whole of the troopers break into a trot, dispersing themselves over a limited space and cut sword point at one another. This mêlée lasts several minutes. When the captain sees that the squadron is thoroughly broken up he sounds the rally, indicating at the same time by a sign of the hand to the officers the direction of the new front of the squadron. The officers are placed in the winking of an eye, and the whole squadron forms behind them at charging pace. This is merely an approximate arrangement. The Officers and Non-Commissioned Officers do not take up their position according to regulation, they only endeavour to rally the greater part of the squadron in the quickest possible time, the men place themselves wherever they can re-forming the ranks as soon as possible and the whole squadron is inverted. It must be remarked that all this is done with surprising rapidity and as soon as the squadron has regained shape it starts again

solidly at the charging pace without waiting for the few laggards who have failed to rejoin it. The whole question is to rally the mass in order to re-form it and to charge with it again instantaneously.

These exercises which are very fashionable, are frequent during the instruction, and are often repeated during the inspections. It is impossible to doubt that they are of great use in developing suppleness and presence of mind among the troopers, and these also are taught that the inevitable object of a charge is the *rencontre*, the shock, and the mêlée. In reality it may be doubtful whether any squadron engaged in a mêlée would be able to leave one adversary to throw itself upon another; nevertheless the disorder after a charge, even if successful, and at the end of a mêlée is always considerable, and a rapid rally with hastily formed ranks is a most useful manœuvre, because it teaches the men always to pay attention to what is passing around them, and to hold themselves ready as soon as a charge has been successfully delivered, to repulse a new attack. After this second charge a few evolutions are generally performed at a trot to judge of how the officers and men behave in this transitory and unhabitual formation, the troopers glancing about them and recognising their places during the march. Finally the squadron is halted and the Captain orders it to reform, when the men take their proper places in the ranks.

These exercises terminate the second part of the inspection, and then commence those whose object is to ascertain the inventive spirit and intelligence of officers; in other words these latter are made to resolve certain tactical problems. In the mean time, so as not to lose the period of repose, the men are also made to execute certain very practical manœuvres in order to see whether they are masters of their horses, and whether the horses are trained to leave the ranks individually. With this object officers and non-commissioned officers are sent to the front in different directions and halted 200 to 400 yards from the squadron. The Inspector calls out certain troopers each of whom he orders to take such and such an order at a given pace to such and such officer and non-commissioned officer. Thus Schutlz goes off at a trot in one direction, Muller in a gallop in another, and Haus at a charging pace in a third. Each on returning reports the execution of his mission and the answers which they bring enable it to be known whether the order has been correctly transmitted. Several troopers are never sent one after another in the same direction because the horses are only too well trained to follow one another, and therefore one object of the exercise would be wanting. Every trooper has to remember that at any moment he may be called from the ranks for a mission of this kind, and consequently men as well as horses must be accustomed to these exercises in time of peace. Ordinarily for these individual missions the men are not moved out of the ranks at a rapid pace, sometimes indeed, they are directed to leave the ranks at a walk, for this is more difficult for a horse accustomed to feel his neighbours, than to be started out sharply at a trot or a gallop.

After having thus rested the squadron for a time, they commence the tactical exercises, as has been said. The following are some of these exercises :—

Three or four trumpeters are sent under an officer of another squadron in a certain direction unknown to the squadron or its chief. At a considerable distance they place themselves in line to represent the front of a squadron which advances at a walk and appears to prepare an attack. As soon as the commander of the squadron sees his adversary approach towards him he gives the order to attack the enemy, on his left flank for example. He immediately advances his squadron warning the officers of his intentions and dispositions, and endeavours while advancing to gain the flank of his enemy unawares, by oblique or other manœuvres. The adversary passes from a walk to a trot, then to a gallop and changes front on the march. With a front formed of three or four isolated troopers it is difficult to determine the true direction of the adversary's march, and the commander of the squadron and his officers need great attention and all their skill to avoid being deceived. When an officer is thus able to discover the movements and the direction of a squadron represented by three or four troopers it will be much easier for him to do so when opposed to a real adversary, this is at all events the opinion of the majority. Arrived at a suitable distance the squadron precipitates itself at a charge upon the trumpeters, the Inspector gallops up to the spot, compares the respective position of the two fronts and judges in what measure the problem has been resolved.

It is laid down as a rule that after an unsuccessful charge the squadron shall always retire at charging pace, because every minute lost under fire of the adversary causes considerable losses, and the squadron should consequently retire rapidly beyond range in order to reform as quickly as possible and to prepare itself as much as possible for a new charge. In exercises of cavalry, retreat is never at a walk but always at charging pace.

Another squadron had to manœuvre in this way during the inspection. It was first divided into two equal parts of two sections each ; One of these troops was ordered to occupy with dismounted men a small lunette which the other troop was to attack. The commandant of the latter, having ascertained that the troopers holding the horses of the dismounted men were placed at the gorge of the work, and that the openness of the ground preventing his attempting an attack on foot determined to turn the lunette, and without regarding his adversary's fire, to precipitate himself on the gorge of the work in order to sabre the dismounted men and those troopers who held their horses. For some moments he made use of the salient of a small wood to cover his movements, then debouched unexpectedly and charged between the left flank of the redoubt and the small wood. The section ordered to protect the horse keepers, was masked by some underwood at the gorge. As soon as it saw the adversary menace the left flank it divided itself, 10

or 15 men remained to protect the horse keepers and the remainder advanced under cover of the brushwood. At the moment of the charge the attacking troop was received by the fire of the dismounted men. The section protecting the horsekeepers attacked it in front and the section debouching from the underwood attacked it in rear. The rencontre was very happily brought about in a narrow space between the flank of the redoubt and the little wood. Only a few troopers penetrated into the redoubt. The assailing troop was repulsed and pursued about a mile and a half, and the dismounted men quickly remounting, took part in the pursuit.

Without entering into the tactical points of this exercise I (Baron Kaulbars) may remark that the officers on both sides were ignorant of the measures taken by their adversary, although the problem was given on the spot—nevertheless the manœuvre was executed with much cleverness and skill.

This example is described, above all, to shew from what point of view the Prussian Cavalry regard the question of instruction, and what sort of practice they exact from even such small tactical bodies as the squadron. When the review is over the Inspector collects the officers, criticizes, and dismisses the squadron. This inspection lasted three hours.

C O N T E N T S .

Vol. VII., No. 30.

I.—Narrative of the Cachar Column, Looshai Expeditionary Force, by Major-General Fred. Roberts, C.B., V.C., Quarter Master General in India.—(<i>Continued from No. 8, page 65.</i>) ...	1
II.—The Turkish Army, translated from the Russian, by Walter E. Gowan, Captain, Bengal Infantry ...	17
III.—Cavalry <i>versus</i> Infantry, by St. J. F. M. a Cavalry officer ...	26

CORRESPONDING MEMBERS.

NAMES	CORPS.	STATIONS.
Major H. C. P. Rice	1st Sikhs	Kohat.
Lt.-Col. F. B. Norman	24th Punjab N. I.	Jhansi.
Major P. C. Story	Garrison Instructor	Sealkote.
Lieut. A. Howlett	Sappers and Miners	Bangalore.
Major F. B. Roberts	Royal Artillery	Delhi.
Colonel H. S. Obbard	41st Native Infantry	Morar.
Major J. F. Fitzgerald Cologan	Station Staff Officer	Barrackpore.
Surgeon Major Evatt	Army Medical Dept.	Fyzabad
Capt. J. A. S. Colquhoun	Commissary of Ordnance	Peshawar.
Colonel E. W. E. Walker R.A.	...	Dalhousie.
Captain Becke	Marine Battalion	Bombay.
Captain Elias	59th Regiment	Dagshai.

Corresponding Members leaving stations are requested to ask some other member to take up the duties, merely reporting the same to the Secretary.

CONTENTS.

Vol. VII., No. 31.

I.—Narrative of the Jawaki Campaign, by Captain J. M. Trotter, Quarter Master General's Department	47
II.—Persia :—its political past, present and future, by Major St. John, R. E.	97
III.—Hindu—ism :—history of Native Races in the Indian Army. Extract from records in the Adjntant General's Office	115
IV.—Lecture :—the Telephone and its application to Military and Naval purposes, by W. H. Preece, Vice-President, Society Telegraph Engineers, and Member of Institution for Civil Engineers, taken from the Journal of the Royal United Service Institution	143
V.—The Telephone :—utilized on Outpost Duty, translated from the "Militair Wochenblatt," No. 3, 9th January 1878	151
VI.—Picket Lamp :—designed by Major Frank James, Bombay Staff Corps, passed Instructor in Military Signaling and Electric Telegraphy	153

C O N T E N T S .

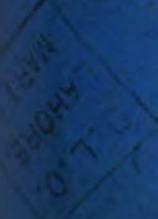
Vol. VII., No. 32.

I.—Infantry Company Signals in Action, by Captain R. H. Fawcett, 33rd Regiment	163
II.—A month in the Balkans in 1877, by Frank Eustace, Esq., R. H. A.	173
III.—The Adaptation of Railways to Military Transport, by Major A. Le Messurier, R. E.	187
IV.—Studies on Military Transport, by Brevet Major G. A. Furse, 42nd Royal Highland Regiment	213
V.—The Austrian Cavalry, by Major A. H. Prinsep, 11th Bengal Lancers	261
VI.—Report of Discussion on Major St. John's Paper on "Persia"	271
VII.—Vertical Fire of Musketry, and its possible employment in Attack, by M. Martin, Lieutenant, R. E.	273

C O N T E N T S.

Vol. VII., No. 34.

I.—Race as modified by climate, with special reference to the European soldier in India, ³ read by Surgeon General J. H. Ker Innes, F. R. C. S., C. B., on 3rd September 1878	381
II.—The Telephone, the Microphone, and the Phonograph, paper read by J. H. Lane, Esq., 17th September 1878	403
III.—Rough Notes on the Russian Army in 1876, by Captain Montagu G. Gerard, 2nd Regiment, Central India Horse	415
IV.—The Tribes of Turkistan, by Captain J. M. Trotter, Deputy Assistant Quarter-Master General	439
V.—Various descriptions of Transport, by Brevet Major G. A. Furse, 42nd Royal Highland Regiment, (<i>continued from No. 32</i>)	461
VI.—Portable Barrack Ambulance for 9 Beds, (taken from a pamphlet written by General Pierre Rörberg of the Engineers, Tiflis Division of the Caucasus, St. Petersburg, 5th November 1875), by Major A. LeMessurier, R. E.	493



NOTICE.

UNITED SERVICE INSTITUTION OF INDIA.

An Exhibition of Military Drawings, open to all Non-Commissioned Officers and Privates of Artillery, Cavalry, and Infantry doing duty with their regiments in India, will be held at Simla, during September 1878.

All drawings intended for competition, to be with the Secretary by the 15th September.

FIRST PRIZE	...	...	...	70 RUPEES.
SECOND "	...	...	...	30 "

The drawings to consist of Military Sketches of Ground, executed in the manner taught at the Garrison Instruction Classes throughout India.

Drawings may be sent either framed or unframed.

By order of the Council,

II. II. STANSFELD, *Lieut. Col.,*
Secretary, United Service Institution of India.

SIMLA,
4th March 1878.

N O T I C E.

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1878.

Members can pay their subscription to the Alliance Bank, Simla if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV, V and VI to any member wishing for the same.

H. H. STANSFIELD, LIEUT.-COLONEL,
Secretary.

ORIGINAL PAPERS.

I.

NARRATIVE OF THE CACHAR COLUMN LOOSHAI EXPEDITIONARY FORCE,

BY

MAJOR GENERAL FRED ROBERTS, C. B., V. C.,

Quarter Master General in India.

(Continued from No. 8 page 65.)

Note.—Unavoidable circumstances have prevented the writer concluding his Narrative before now.

Colonel Stafford, with the Head Quarters and wing of the 22nd, had been brought to the Toweebhoom on the 23rd, and we found that his men had effected a considerable clearance on both sides of the stream, this site we made No. 7 station, the absence of all habitations South of Nynaidium having necessitated the several encampments being designated by numbers instead of names; all this time the Looshais, themselves completely protected by the dense jungle, gave us much trouble by continually firing upon coolies and working parties; the two following days the road back to No. 6 station was improved, and that to our own front towards Pachoee and old Kholel reconnoitred.

On the evening of the 28th Colonel Rattray, C. S. I., with the Head Quarters and 200 of his regiment, the 42nd N. I. arrived in Camp, and the following morning the General marched back to the burnt villages of new Kholel,—the object of this was to punish the Looshais for harassing our communications, and to shew them that we had only left their hill for reasons of our own, and to enable Captain Badgley and his surveyors to sketch the ground. A few shots were fired as we started which wounded a man of the 42nd, but after we had gone a short distance, and when the leading skirmisher was picking his way through a narrow path, a Looshai clothed in an orange colored garment, met him, this proved to be "Dorpong" one of Poiboi's emissaries, who had left our Camp on the 18th, and who now appeared with a flag of truce as the representative of the Kholel people—the General consented to a temporary cessation of hostilities, on condition of the survey party being allowed to prosecute its labour, so we ascended to the village we had occupied on the 23rd, where Mr. Edgar arranged preliminaries with the head men. The Looshais, thinking that our retirement on the 26th was caused by our inability to cope with them, and that it was prepa-

ratory to our leaving the country altogether, began to re-occupy their houses, when therefore they saw the force marching again towards their villages, instead of hurrying back to Tipai Mookh as they had expected, they were quite taken aback, and not wishing to lose more property, decided on submission. It was not our desire to inflict heavier punishment than was necessary, indeed our great object was to get to Chumfai as quickly as possible, so soon therefore as the Kholel people agreed to make themselves responsible for the safety of our communications between Tipai Mookh and the Toweebhoom, and to send three of their number with us as hcstages, we speedily came to terms—all this time we had no means of communicating with the Looshais, of learning their intentions, or of letting them know ours, the presence of the three Kholel men in our Camp overcame this difficulty, and throughout the remainder of the expedition they did excellent service for us on more than one occasion.

Large numbers of Looshais came into camp daily while we were at the Toweebhoom, bringing fowls and eggs to barter for salt, or whatever they could get, and as they gained confidence, they began to examine revolvers, swords and binoculars, they protested that they did not intend to provoke hostilities, and that the shots fired into our advance on the 23rd, and which cost them so much, were the work of a few headstrong men—the truth is that when the Kholel people found we were resolved to advance to their villages, they not unnaturally looked upon our denial of any intention to injure them, as a device to keep them quiet until we could get possession of their property and families, and therefore determined to oppose us. In the afternoon we returned to the Toweebhoom when intelligence was received of an attack having been made on the 27th by a party of Looshais on some mahouts, while collecting forage for their elephants near Tipai Mookh, one elephant and three mahouts were killed, and one elephant and a mahout wounded.

The route now lay over the Parbachung range to the Toweetoo, a small tributary of the Tipai, where No. 8 station was formed and then by a steep pull to the ridge on which the old Kholel villages were situated.

We halted at Pachoee on this ridge, which became No. 9 station from the 9th to 17th January getting up supplies, improving the road, and settling affairs with the Looshais. The position was very commanding—on the West the Tipai runs from South to North separating the Soombong and Kholel hills, and on the East the same river runs from North to South, forming the boundary of Poiboy's country. Chipoee the nearest village being on the opposite range immediately facing our camp. We were thus between the Western Looshais—Sookpilel, Khalkom and Vonpilal's men and Lalhi and Impaum, and the Eastern, viz., Poiboy and the Vonolel family, Lalboorah, Lenkom, &c., and having settled the Kholel difficulty, our next political object was to come to terms with the people of Tingridoong and Chipoee, so that we might rely on their not troubling us in the rear in the event of Poiboi's joining the sons of Vonolel, and opposing our further progress.

On the 17th we reached Chipoee. The road had been made down to the Tipai, after crossing which, there was a difficult ascent to the village which tried the climbing powers of the Artillery elephants very considerably. The Looshais again protested against our advancing over the Tipai and promised to bring in Poiboi in the morning if we would only postpone our march. They were told this was impossible, that we had decided to halt at Chipoee that evening and nothing would stop us. In the hopes of carrying their point, they attempted, when we were about half way up the hill, to palm off on us a personated Poiboi, a very common trick of theirs, the cheat was, however, found out, when the Looshais disappeared in the jungle, while we continued our journey to No. 10 station, a fine open position with a good supply of water overlooking the village.

We were obliged to halt at Chipoee till the 22nd, during which time very satisfactory arrangements were made with the people of that village and Tingridoong who agreed to guarantee the safety of our communications between the Toweebhom and Chipoee, and to send hostages with us. It was decided that the road making should cease at Chipoee, to which point elephants would transport all the supplies required by the advance force, coolies carrying them onwards. When a start was therefore made on the morning of the 22nd the Sappers were left behind with orders to complete the road up to Chipoee—a few men with entrenching tools being told off to clear the way for the artillery elephants. The road lay down the face of a very rocky hill to a small torrent, the Syroom Lovec, near which the column halted for the night, and next day, the 23rd climbed on to the Gnowpa range, halting near the abandoned village of Bohmong, which became No. 11 station—here there was a discussion as to whether we should follow the Gnowpa ridge, as far south as a point due west of Sellam, and then cross the Lengting by a very steep and difficult ghaut, or whether we should cross the great range, which we had seen towering above us for several days, by Soorthlong and Moothelen, and thus avoid the rocky Lengting. The Looshais expected us to take the latter route, and had stockaded many strong points on it, determining to make a great stand—for some time previously the intelligence of the defence of the Lengting had been getting more and more definite, and we heard that it was the intention of the Chiefs, if they should succeed in turning our force back, to lose no opportunity of harassing us on our retreat, and not to cease pursuing us until we reached the Cachar district. A long and tedious reconnoitre decided the General on proceeding by the Soorthlong, and as it was very desirable that the Looshais should understand that by adopting this line it was not our object to avoid any opposition they were prepared to make, but merely to secure the best line of communication, the headman of Tingridoong and the genius Dorpong, were sent on to inform Poiboi of the road we were coming, and that he must give up any Munnipoor captives that might be in his villages, and come in person to make submission to us. On the 24th we descended the eastern slope of the Gnowpa ridge, crossed another

hill torrent, the Toowee La, climbed over a spur of the lofty Soorthlong, and halted near a stream which separates it from the Moothelen mountain. The force in Camp consisted of Captain Blackwood's half battery 35 men and 2 steel guns, 60 of the 22nd P. I. under Lieutenant Hare, and about 200 of the 44th (Goorkhas) under Lieutenant Colonel Nuttall, with a large number of coolies.

That night, as we afterwards found out, a great council of all the chiefs was held at Koongnoong, and the plan of operations for the following day was settled. The Looshai force was to be devided into two parties, one of which was to attack our main body while marching along the rocky stream flowing between the Soorthlong and Mothelen, while the other was to steal down the bed of the stream, concealed by the thickest jungle we had come across since leaving Kholel, and to attack the coolies whom they expected to find considerably in the rear and but slenderly guarded. This well meant scheme fell through, for during the previous evening's reconnoitre we were told by Dorpong and the headman of Tingridoong, who were met on the top of Soorthlong, that the neighbouring villages were full of armed men, and that we should be attacked the following morning—General Bourchier consequently marched an hour before the ususal time, and the result was that the advance guard of the 44th under the command of Captain Robertson, were in the ravine before they were expected, and the Looshais being taken by surprise, commenced fire from both banks.

Almost at the first discharge the General's orderly fell shot through the head, and the General himself was hit through the left arm and hand.—Captain Robertson at once extended the advance guard in skirmishing order up the right bank, while the rest of the Goorkhas under Lt.-Colonel Nuttall and Captain Lightfoot ran down into the bed of the stream, up which they skirmished in the most brilliant and dashing manner, the movement was rapidly effected, and the men of the 44th meeting the Looshais face to face, drove them off with heavy loss. The ravine was filled with large boulders which afforded admirable cover to the Looshais while advancing, but which, at the same time, prevented their beating a hasty retreat; the conduct of the 44th was admirable, finding they were over weighted, the men threw off their cloaks and waterproof sheets, and climbing over the rocks in the face of a heavy fire, never stopped advancing until the Looshais were lost sight of in the heavy jungle.

A few of the enemy nevertheless succeeded in stealing down the arvine, and attacked the Battery Elephants and baggage coolies, but the gunners had the aid of Lieutenant Hare's Punjabees, and Captain Udny's rear-guard of the Goorkhas, and gave them such a warm reception that after a few minutes they were glad to desist. Meanwhile General Bourchier, after clearing the ravine, commenced the ascent of the Moothelen, the climb was very severe, and in a particularly precipitous place, a formidable stockade barred the road, but our advance had been so rapid that the enemy, who had retreated by a more

westerly spur, had not time to reach it—then came a sheer precipice across the face of which we had to go by a narrow path, which brought us face to face with another stockade, and from this the Looshais who had arrived before us, kept up a pretty steady fire, before the advance guard under Captains Lightfoot and Robertson, could turn their flank. As soon as this manœuvre was performed the Looshais disappeared into the forest, and allowed us to occupy the village of "Koonguoong," 5,500 feet above the sea, without further opposition.

Our casualties amounted to:—

- 1 Officer (Brigr. General Bourchier) wounded.
- 3 of the 44th Native Infantry killed.
- 1 " severely wounded.
- 2 " Peshawur"Mountain Bartery ditto.
- 1 Constable ditto.
- 1 Coolie killed.
- 3 " severely wounded.

While of the enemy, as we ascertained afterwards, there were upwards of 60 killed and wounded—it was evident at the time that they had suffered severely, for a fatigue party, who went to burn the bodies the next day found them lying just as we had left them, the heads of two only having been cut off, a significant fact of the Looshais having retired in great confusion, for they consider it a sacred duty to prevent the heads of their friends killed in action from falling into an enemy's hands.

The coolies with the baggage all reached "Koongnoong" before dark, but the Artillery, finding it impossible to bring all their elephants over the narrow ledge of rock near the stockade, had to bivouac there for the night in a more than usually rough fashion. On the following morning the road was somewhat improved and an attempt was made to bring the fifth elephant that had caused such delay, across the narrow ledge, but she positively refused to make the passage.

This decided the fate of elephant carriage for the guns—it was quite evident from the nature of the country that elephants could not keep pace with the column, and as it was essential to have the guns in the front, if they were to be of any use, and as a small force was under orders to move off at noon for the purpose of attacking the village of Taikoom, which was understood to be very strongly situated, it was arranged to return the elephants to the commissariat for transporting supplies up to No. 10, and to carry the 2 steel guns, with 9 rounds of ammunition for each, by coolies. It took some little time to settle the loads, but at the appointed hour on the 26th everything was in readiness—36 coolies were told off to the Battery viz:—

6 for each gun	...	...	...	150 lbs.
6 for each carriage	...	...	...	130 lbs.
2 for each wheel	...	...	...	54 lbs.
3 for each ammunition box	...	...	...	108 lbs.

Lt.-Colonel Roberts, v.c., took command of the party, which consisted of 50 of the 22nd Native Infantry under Lieutenant Hare, and 50 of the 44th Native Infantry under Captain Robertson, besides Captain Blackwood's guns. The march was over most difficult ground, down to the deep valley dividing the Mothelen from the Soorthlong, and then up a ridge of the latter 6,000 feet above the sea. After going 3 miles the forest became somewhat less dense, and we were enabled to see a difficult stockade about 2,000 yards off, built across the road where the ascent was steepest, it was filled with armed men, and as an attack in front could only have been successful after a sacrifice of life—it was decided to make a detour and turn the position—this was effected with considerable labor, along the side of a precipitous mountain 6,000 feet high, covered with thick jungle; the movement was observed by the enemy who were so disheartened by our getting in their rear without running the gauntlet of the work they had thrown up with much trouble and no little skill, that they hurried to occupy their village without taking advantage of any of the natural defences on the way. About half past five P.M., the troops emerged from the jungle, and found themselves face to face with Taikoom, at about 1,200 yards distance. They stood on a bare knoll, and looked over a wide dip, beyond which rose another hill, on which the village stood, stockaded all round and defended by a large number of the enemy. The guns were rapidly brought into action, and for the first time the Looshais understood what it was to provoke hostilities with an enemy possessing Artillery. Each gun fired a shell, the second bursting with the utmost accuracy in the centre of the village, where the enemy were in a dense mass. Colonel Roberts then charged the palisade with the Infantry, the guns firing another round each, over their heads. The Looshais could not stand this and fled in great confusion into the forest. Owing to the darkness it was impossible to follow up the advantage further; so the village was burnt, and the force returned to Camp about 11 P.M., a severe day's work achieved without a single casualty on our side, while of the enemy four were killed, one by Infantry and three by Artillery fire.

The affair at Koongnoong and the destruction of Taikoom, made all further resistance impossible. The Looshais seeing clearly that they had been completely beaten, and though some of the chiefs wished to try their luck once more, they could not get any support from the people, indeed entire villages deserted them, and between the 27th January and 14th March upwards of 2,000 men, women and children joined the Munnipoories, while as many more probably went off to Kamhow, the Poies and Sookpilal.

From 27th to 31st January the Force halted at Koongnoong and Commissariat stores were collected, preparatory to a move on Sellam, which was Poiboi's head village and stronghold, said to be two or three marches distant. In consequence of complicity in attacking us on 25th, the General altered the terms on which he would be received, and had word sent to him, that in addition to giving up any captives, he

must pay a fine of rice, metnas, goats, pigs and fowls and accompany us to Lalboorah's village. This was paid before we reached Sellam.

The position now held, may, in the words of the General's Report, be thus described :—" Having passed through the villages of Kholel, " known generally as Vopilall's, and again the more westerly villages of " Poiboi, the ground passed through was divided into commands, Lieutenant Colonel O'Bryan with a wing of 22nd Punjab Infantry holding " from Nynadhuur to Tipai Mookh, Lieutenant Colonel Sheriff the three " Stations from Tipai Mookh to the ridge above the Tooweebboom, Colonel Hicks with the Head Quarters detachment of his Corps, from the " Tooweebboom to the Toowetoo, and Colonel Rattray, with more than " half his Corps, occupying the most important position of all viz., from " Pachoee, on the ridge commanding both old and new Kholel, to the " point now held by the advance Force, which commands the Gnowpa " ridge or range and the villages in our rear."

While at Koongnoong the General received telegraphic instructions from the Quarter Master General stating the desirability of our column communicating with or meeting that from Chittagong, but leaving it open for him so to act, that the best results might be secured, the main injunction being that the Column must be back at Cachar by 10th March or approximate date, to prevent its being overtaken by the Rains.

That the Columns never did meet, and why, will be alluded to hereafter. The most important thing to be done was to reduce to submission the families of Lalboorah. If any doubt existed that they had engaged in the Monierkhal and Nugdigram raids of last year it was removed by the fact of our finding on the body of one of Lalboorah's men, killed on the 25th, cartridges which could only have been obtained by Looshais in the attack on the Rear Guard of the 4th, at Nugdigram* in January 1871, and further by none of Lalboorah's people ever attempting to come to terms with us or Munnipoor. Their attitude throughout was one of defence.

On the 29th the road to greater Koongnoong was reconnoitred by Colonel Roberts and a strong party, as we thought our route to Sellam lay that way, but the next and following day enabled us to find a better line. We also heard by telegram from General Brownlow that " Mary Winchester" had been unconditionally surrendered by the Howlongs, and a few days afterwards our congratulations were telegraphed to him by General Bourchier.

The emissary Dharpong returned to Camp, and he stated that Lalboorah and Thangdung were both engaged in the affair of 25th and have now gone for help to the Poies.

At Koongnoong one of the Survey Calassies was severely handled by two Looshais who had been in our Camp, and on leaving it had met

* See page 46, No. 7, Vol II, Proceedings U. S. I. of India.

this Calassie returning from a water reservoir, when some altercation ensued about the "right of way," ending in his being seriously wounded. It was ascertained that the two men belonged to greater Koongnoong and word was sent there at once that the guilty one must be delivered up. Strange to say he came of his own accord into our Camp the same day bringing part of the fine from Poiboi and being recognized was made a prisoner. He acknowledged to cutting down the Calassie, thought little of it and said he had been insulted. Unfortunately this man escaped from the Sapper guard some days after.

Dombhoong the most important of all Poibois' headmen came into Camp bringing letters from General Nuttall and according to his story there was no doubt Poiboi had had enough fighting and wanted to make his peace with us. The village Taikoom, destroyed on 26th belonged to this man, who said he had been away at Cheeboo at the time of the fighting on 25th and 26th. He accompanied the Force on its onward journey though somewhat reluctant to do so at first.

By the first February preparations were complete for making another advance, and on that date we marched some eight miles, crossing two ridges, the highest 5,850 feet elevation, and then descending rapidly found ground for Camp on the banks of a small stream in a thick bamboo jungle. Next morning starting early, we ascended a ridge about 5,800 feet elevation, and gained the crest of the Lengteng range from which point we had a magnificent view of the Sellam range on the summit of which lay Poibois' villages extending some miles. A curious, if not touching incident occurred on this march. One of the Kholoel men, Bhoma by name, who accompanied us, was reported as having in his possession a Muunipoor woman whom he had captured in a raid in 1869. Dharpong a man of vast resources and possessing decided theatrical talent had been employed in sifting the matter. When the Column was halted he suddenly appeared in our midst bringing with him the captive woman and accompanied by other Looshais bearing elephant tusks, fowls, goats, &c., and the inevitable squeaker. Alongside the General was Bhoma to whom the woman advanced and clinging to his shoulders begged hysterically that she should not be separated from her spouse. Truly her lines had not been unhappy and the British protection we offered her was a thing of nought. The General, if not affected, was embarrassed as to deciding on a separation but wisely determined on both of them remaining in Camp for a time.

To return to our march. Having viewed "Sellam" satisfactorily from our distant position, we made tracks accordingly, and after a tedious detour we gained a summit that brought us in close proximity to the long stretch of villages and gave us the command of them, but no opposition was offered, the inhabitants had all fled. There were five villages in all with some 3,000 inhabitants, we afterwards estimated, and having selected the best (Poibois own) our quarters were soon told off and we made ready for the night. Water was scarce, or rather it was too dark

to find it, but one thing abounded and that was " Pig." The coolies (Nepalese in particular) had a chase after them and a hearty meal no doubt. It was probably while discussing their merits that some careless individual caused us a night alarm, which might have turned out more serious than it did. About midnight the cry of " Fire" arose and at first it was not known whether the enemy had not a finger in it, so precautions had to be taken. The huts we occupied were most inflammable and the flames spread far too rapidly to be pleasant. It was only after the most strenuous exertions, by tearing down and carrying off to a distance several huts in hope of preventing the fire from spreading, and by a providential lull in the wind, that we succeeded in staying the conflagration. At one time the General contemplated beating a hasty retreat as best we could, so hopeless seemed the task of extinguishing the flames, as house after house caught fire, and but for the splendid way in which officers and men worked, the further progress of the expedition might have been marred. Of course the occupation of this village would not have occurred had we not arrived so late, but coolies and baggage were not all in by dark and there was not time for other arrangements, added to which the night was bitterly cold. Next morning we moved to a better site to the south-west of the group of villages and camped ourselves in the usual fashion, and as our stay here was likely to be lengthened we could afford to improve the occasion and make our huts comparatively comfortable.

Since reaching these high elevations in Poiboi's country the roads were better defined, the forests much more open and a larger extent of land under cultivation. This was fortunate, for there would not have been time to make roads or cut a path through jungle such as we had often previously encountered. The climate too was superlative.

We halted at Sellam ten days in order to collect supplies, to carry which onwards we had now to depend on the Cooly Corps and Mr. Edgar's civil coolies, the Commissariat being unable to work beyond this point. The Looshais of these deserted villages might be seen by their fires in the distant jungle, but gradually they gained confidence by conciliatory measures and began to reinhabit their homes to some extent, while numbers came to our Camp daily, when bartering took place largely, and altogether they seemed to have a good time of it. Our intercourse with them was beneficial and they learnt that although when necessary we can hit hard we are not actuated in our advance by a desire for revenge.

The General had now resolved to advance on Lalboorah with the smallest amount of baggage; and the scale was reduced to the following:

Each European officer	...	...	10 Seers.
" Native "	...	...	5 "
" Private "	...	...	3 "

twelve days food being taken with us.

We started from Sellam on 12th February, viz., 400 Infantry and 31 Artillerymen with two guns, passed through a small village called

Rahmong, the inhabitants of which deserted it on our approach, and having marched some three miles along the high lands, descended the valley and reached a fine stream, the Dinkai. On the opposite side of the valley was the village Toolcheng about 1,500 feet above us, and thither we wished to make for the night. Two of the villagers joined us. Our path wound up a rocky ascent and about a third of the way from the summit of the hill led through a narrow gorge strongly stockaded, the ground on either side dotted with small breastworks cleverly planted so as to give a good cross fire, while lower down large trees which had been felled formed serious obstacles for an assailant. There had evidently been great pains taken over this work, exhibiting considerable engineering skill, and that too quite recently, so we had no doubt it was prepared for our benefit. A direct attack by Infantry would have been ruinous but we could have shelled it hotly with a little trouble. Opposition there was none. The villagers, women and children included, had not even left their homes and at their earnest appeal the General did not occupy the village but made us bivouac outside.

Next morning Dhurpong brought us word that Poiboi was close by, but could not summon up courage to come into Camp. Some of our men were sent to identify him, and this time it proved no sham. Several efforts were made to induce him to speak with us, his own Muntries vainly assuring him of no danger, but just as he was about to make the leap, abject cowardice prevented and off he would bolt into the jungle. We must make allowance for him and he doubtless feared, poor boy, the fate of Lal Chokla,* and thus hesitated to tender submission in person, though he sent profuse assurances by messengers of future good conduct towards us. It was clearly explained to him through his headmen that he must come himself and see the General if he wished to save his villages, for unless he did so, they would be destroyed on our return journey.

The march of the 13th though only about 9 miles, was a tedious one, and occupied us from 9 a. m. till dark. The first part of it was a steep and rocky descent with a perpendicular drop at one spot of 20 feet, down which we had to scramble by aid of a rickety ladder, no easy task for soldiers fully accoutred, and laborious work for the gunners and coolies, whose materiel and loads had to be lowered mostly by ropes. Shortly before reaching Camp we had a fine view of "The Gates" or "Lalboorahs Gates" as they are called, being the resemblance, formed by nature on a grand scale, of an entrance to a far off land, range over range of mountain appearing in the distance, picturesquely lighted up on this occasion by a setting sun.

A short march on the 14th brought us to the junction of two rivers the "Tooweto" and the "Taow," and this became No. 17 station, elevation 3,600 feet. We reached the first named after descending some 1,700

* Referred to in first part of this Narrative, Page 46 No. 7, Vol. II.

feet from our Camp ground of the previous night, and had a pleasant journey along side its course for about 3 miles. It seemed as if we had now crossed the watershed and were among streams running either to the Irrawaddy or the Koladyne in a southerly direction. A halt took place on the 15th in order to give the coolies some rest, and fortunate it was we did so for it turned out a very wet day. Dhorpong with two others who had been sent on ahead, in order to ascertain the attitude of Lalboorah, returned with the news that his villages had been attacked by Soktes under Kamhow, who were repulsed. This attack was probably made by Kamhow on hearing that the Munnipoor contingent had withdrawn from Chiboo, consequent on sickness and general want of supplies ; it had somewhat restrained him hitherto. Many Looshais from the village ahead, Lenkom, came into Camp to-day bringing presents. The morning of the 16th saw us on the move again, eager to gain our goal which was the village Chumfai, supposed to be, we then thought, three or four marches distant. Ascending at once from the bed of the river, we had a climb of 3,000 feet in the course of four miles, by a well beaten road which brought us to the village Lenkom on the Morthlang Range. Here numbers of men, women and children flocked out to meet us, and were evidently pleased at our coming. One old venerable, who declared he was 100 years of age, knelt at the General's feet and offered him his all. It was curious how keenly our dress and accoutrements, including revolvers and binoculars, were examined here and at many other places, but what puzzled the native more than anything was the white man's fair skin. It was almost a case of undressing to assure him there was no deception. Our march beyond this village for a couple of miles was a lovely one, passing as we did along the range, at an elevation of 6,000 feet, and through a forest of oak, rhododendron and fir trees, and reaching after a gradual descent a ridge from which we viewed for the first time an extensive plateau with villages of Lalboorah at the further extremity. Continuing our descent we passed the burnt village of Peema where we had meditated halting, but were prevented for want of water, and after completing a march of 12 miles, reached a stream in the valley at an elevation of 4,900 feet. Here we passed a very cold night, a strong wind blowing and making it difficult to burn fires.

Next morning the 17th February 1872 we marched for Chumfai, Lalboorah's chief village, the immediate destruction of which was, the General considered, a necessity. The stronghold was deserted. It was situated on a slight elevation at the head of the valley and consisted of probably 500 houses. In the centre was the tomb of Vonolel, the father of Lalboorah, and a description of it may be interesting. A platform of stone about 30 feet square formed the base, and around it was a high paling of timber, chiefly posts, on which were suspended numerous skulls of every animal in the country, elephants, metnas, tigers, bears, deer, &c. There were also other uprights, inside the enclosure, surmounted with skulls, while to crown the edifice on the top of a post near the centre, was the fresh slain head, arm, and leg of a Sokte said to have been killed at the recent fight before alluded to.

The General having drawn up his little force round the tomb, addressed a few words to the troops, thanking all ranks for the good conduct and discipline that had prevailed throughout the operations, and had led us so successfully to the heart of the enemy's country, concluding his remarks by a call for three Cheers for our Queen and Country which was loudly answered.

This and some twelve other scenes connected with the Expedition were photographed by Capt. J. F. Cookesley, R. A., * and considering the difficulties in such an undertaking, he deserved much credit for his interesting productions. The Force then moved to a camp ground adjoining, and the village was set on fire, the tomb being spared.

We had now reached, as it were, the end of our tether, and before retracing our steps it was necessary to dictate terms to Lalboorah whereby he might save other of his villages, and accordingly the General on the 18th instant, marched to the village "Chumsin," situated on a lofty mountain 3 miles to the North-west of Chumfai, where the widow of Vonolel resided. The headmen of this place came to our Camp the previous day but were refused audience until they produced some of the plunder they were credited with carrying off from Monierkhal and Nudigraim, and in the course of the evening a few articles were brought in, viz., a police musket, pouch and coat of the 4th N. I. clearly confirming thereby the complicity of Vonolels family in the raids aforementioned. On approaching the village, which was strongly stockaded, it seemed as if our entrance would be opposed, for a large number of armed Looshais appeared shouting and yelling as if to deter us, but we were used to this and a steady advance soon brought them to their senses, the headmen dispersing most of the crowd. Placing some troops round the village the General entered with a few men and then explained the terms imposed, which were:—

1st. Failing to produce Lalboorah, the three headmen of the village should return as hostages with us to Tipai Mookh.

2nd. That Agents of our Government should have free and safe access to their country.

3rd. That all arms taken at Monierkhal and Nudigram be given up or a similar number of their own, 12 in all.

4th. A fine of:

2 Elephant Tusks.	10 Goats.
1 Set War Gongs.	10 Pigs.
1 Rajah's Necklace.	50 Fowls.
4 Metnas.	20 Maunds of husked Rice.

* This officer died at Cherra Poonjee, on return from the expedition, of diseases incurred thereon.

He remained in the village till 4 p. m. during which time the Survey party had a favourable opportunity of making observations. The terms were again repeated and we withdrew to our Camp near Chunsin. We had misgivings about our demands being complied with in full, especially as regards the Arms, but by the 20th February, the fine was paid up with the exception of a little Rice.

The 19th was occupied chiefly in searching the country round about for villages, the Survey party being busy as usual, and the Artillery looking out for a good elevation from which to fire signal rockets and raise a bonfire, whereby it was hoped to notify our position to the Chittagong Column ; we were then in

Latitude 23° 26' 32."
Longitude 93° 21' 0."

This hope was never fulfilled, and a glance at the map will show that it was impossible, owing to the different line of country each column was compelled to take, in order to reach the head centres of the How-longs and the Eastern Looshais respectively. An impression existed in the public mind that the two Columns, operating from North and South, were started with a view of meeting imperatively somewhere about half way, but such was not a *sine qua non*.

That the two columns meeting would have been very satisfactory is undoubted, and that they would have met had more time been available is also quite certain, but one injunction from Government was imperative and that was : the two Columns must be back at Cachar and Chittagong by the 10th March, in order to escape the malarious climate and the Rains.

Accordingly on the 21st February 1872, we commenced our return journey from Chumfai, the several detachments at Posts in our rear being gradually withdrawn to Tipai Mookh. Nothing of moment occurred, not a shot was fired, and the villagers as we retired were always keen to come to our Camp and barter provisions. Poiboi never came in, and doubtless fear alone deterred him. His villages were spared, as our line of communication while we advanced on Lalboorah had in no way been harassed and we had every reason to suppose the submission of his tribe was complete. The hostatges were released at Tipai Mookh, and they, as well as other Looshais who accompanied us, seemed sorry to leave.

By the 10th March we had all cleared out of Tipai Mookh, men and provisions, but not before disease and sickness had commenced their work. Cholera was amongst us and strenuous were the exertions required to stay the spread of this fell scourge.

The passage from Tipai Mookh to Cachar was mainly effected by

river, and an invaluable auxiliary it proved. Besides boats innumerable, rafts were built from the never failing Bamboo, and on these men and stores were cleverly piloted.

Thus ends the Narrative of the Expedition, the successful issue of which has been fully testified by Government in the General Order by His Excellency the Governor General of India No. 480, dated Fort William, (Military Department,) 30th April 1872, an extract of which is here subjoined :

"The Governor General in Council concurs with the Commander-in-Chief in highly appreciating the excellent services which have been performed, and desires cordially to congratulate His Excellency on the satisfactory conclusion of an expedition, which owes much to the thoughtful and unremitting interest His Lordship has throughout taken in the operations."

The result of the operations may be briefly summed up thus :— Payment of the fines and tribute demanded, together with the entire submission of the tribes of Vonolet, and those of the Howlong and Sylloo factions of the Looshai race, the recovery of Mary Winchester, and the restoration to our Ally the Rajah of Munnipore, of more than 2,000 of his vassals, with the rescue from slavery of several hundreds of our own subjects.

The Cachar Column, under Brigadier General Bourchier advanced 193 miles from Cachar, and 110 miles from its first base, Tipai Mookh, in the enemy's country, finally reaching the stronghold of Lalboora, the most powerful of the Northern Looshai Chiefs.

The Chittagong Column under Brigadier General Brownlow advanced 213 miles from Chittagong, and 83 miles from the first advanced base.

Difficulties in carriage and in keeping preserved long lines of communication, were overcome in a highly creditable manner, the Military qualities of Commanders were evinced by the skill with which they conducted operations, and the endurance of the troops was tested to a great degree.

Friendly relations were established with most of the inhabitants of the country traversed, and they were led to perceive that the main end we had in view, was not one of pure retaliation, but more to show them they were completely in our power, and to convince them of the advantages of trade and commerce, besides demonstrating effectually, that they had nothing to gain, and every thing to lose by placing themselves in a hostile position towards the British Government.

CASUALTY RETURN OF THE CACHAR COLUMN

OF THE

LOOSHAI EXPEDITIONARY FORCE.

	FIGHTING MEN.			FOLLOWERS.		
	Killed.	Wounded.	Died.	Killed.	Wounded.	Died.
General Staff	1*	...	...	...	...
Peshawur Mountain Battery	2	1†	...	...	...
Sappers and Miners, 1 Company	...	1	1	...	...	...
22nd Punjab Native Infantry...	...	4	7	...	...	...
42nd Native Infantry	1	38‡	...	...	2
44th Native Infantry	8	3	35	...	...
Police	2	3	...	...	...
Napaulese Cooly Corps	1	2	234
Commissariat Cooly Corps	1	3	80
Kookée Cooly Corps	53
Boatmen	17
TOTAL ...	8	14	85	2	5	386

* Brigadier General G. Bourchier, c.b.

† Captain Cookesley, attached.

‡ Includes one officer, Captain Harrison.

ROUTE FROM CACHAR TO LALBOORAH'S VILLAGE OF CHUMFAI.

Name of Stages.	DISTANCE.		Rivers and Streams.	Latitude	Longitude.	Elevation.
	Of Stage.	Total.				
	m.	f.	m.	f.		
Luckeopore	14	0	14	0	Barak, a ferry	24° 47' 30" 93° 2' 10" 700 feet.
Alluce Tea garden	6	0	20	0	Barak, a ferry	24 44 40 93 5 15
Camp in the Forest	9	0	29	0		
Boobhundhur Tea garden ...	10	0	39	0		24 36 0 93 6 40
Mynadbur Tea garden ...	10	0	49	0	Barak, a ferry	24 32 0 93 5 30 750 ,,
No. 1 Station	5	0	54	0		24 28 0 93 5 30
,, 2 ,,	6	0	60	0		24 24 10 93 4 0
,, 3 ,,	9	0	69	0	Barak, a ferry	24 21 0 93 5 0
,, 4 ,,	10	0	79	0		24 16 10 93 3 0
Tipai Mookh	5	0	84	0	Tipai bridged	24 13 48 93 3 30 850 ,,
No. 5 Station	6	0	90	0		24 11 25 1,575 ,,
,, 6 ,,	6	0	96	0		24 9 10 3,850 ,,
,, 7 ,,	8	0	104	0	Toowee- bhoom ford-	24 5 50 750 ,,
,, 8 ,,	8	0	112	0	able	24 4 10 1,475 ,,
,, 9 ,, (Pachoe) ...	5	0	117	0	Toweetoo, do.	24 1 40 3,850 ,,
,, 10 ,, (Chipoee) ...	5	0	122	0	Tipai, bridged	24 0 45 4,350 ,,
,, 11 Station	7	0	129	0	Siroomloee fordable	23 57 27 3,840 ,,
,, 12 ,, (Koongnoong) ...	8	0	137	0	Toweela do.	23 55 0 93 17 45 5,500 ,,
,, 13 Station	8	0	145	0		5,175 ,,
,, 14 ,, (Sellam) ...	9	0	154	0		23 47 52 93 19 30 5,750 ,,
,, 15 ,, (Toolcheng) ...	9	0	163	0		23 43 30 93 20 45 5,650 ,,
,, 16 ,, (Booljong) ...	9	0	172	0		23 38 0 93 26 30
,, 17 Station	5	4	177	4		23 34 20 93 25 30 3,600 ,,
,, 18 ,, (Pema)	8	0	185	4		Crossing a ridge 6,600 feet.
Lalboorah's, Village Chum- fai	8	0	...			0 5,000 feet.
25 Marches, Total ... ...	...	193	4			

II.

THE TURKISH ARMY.*

TRANSLATED FROM THE RUSSIAN,

By Walter E. Gowan, Captain, Bengal Infantry.

Much we know, has been learnt too late, and yet it is never too late to ascertain the strength of an enemy. With regard to Turkey, this knowledge is very useful, but it has been especially difficult to obtain. M. Zboinski complains of the labours of the author in the opening pages of this work, and yet he, as a professor of the Military School in Constantinople, should, it would seem to us, have met with as few difficulties as possible.

We are not going to write either a bibliographical or a critical essay on what is before us. The work of M. Zboinski presents itself to us only in the light of material for the study of the Enemy, and in this sense we shall avail ourselves of it.

The direction of the land force of Turkey is entrusted to two Ministers, who are independent of each other. Each department has its own peculiar organization and composition. The two Ministers are respectively the War Minister and the Director General or Grand Master of Artillery. Besides these two officials there exists a Supreme Council of war. Each of these three offices is abundantly provided with facilities for circumlocution. The Turkish army is composed of the Regular forces (the Redifs) and the Militia or Local forces (Moostahfiza).

The Regular forces are divided into (1) the Active Army or Nizams,—whose term of service is for four years—and (2) into a portion of the reserves (Ikhtiyati), whose term of service is for two years.

This remark applies to the infantry only. Men who serve in the Cavalry, Artillery, or in Corps d'élites have to remain on Active Service for five years, and in the Reserve for one year.

In order to maintain the Regular Army and the Reserves at a proper strength, the territory of the Turkish Empire is divided into 7 Circles each of which has to furnish an Army Corps for every 750,000 of the male Mussulman population. Each Circle is further sub-divided into smaller territorial units.

Each army corps consists of two Infantry Divisions, two Brigades of Cavalry, one regiment of Artillery, and one company of Engineers. An Infantry Division is made up of two brigades, and in each brigade

* Review of a work published in French and entitled "Armée Ottomane organisation actuelle telle qu'elle résulte, de l' exécution de la loi de 1869, par Mons. N Zboinski, officier au Corps Royal d'Artillerie Belge." Paris 1877.

there are two line *regiments* and two rifle *battalions*. Each regiment has three battalions. The tactical unit of the Turkish infantry is the battalion. The numerical strength of an infantry battalion, in time of war is 827 men and 19 horses ; 8 of the latter are reserved especially for carrying water.

This "trifling" remark about the horses, "for carrying water," which are provided with such foresight for each battalion seems to us to be worthy of attention. How seasonably furnished would such spare horses have been with our Army whilst on its hot march along the Danube. How much would a supply of water have lightened the privations of our poor soldiers, if horses had been sent to our own battalions for such a purpose !

In each Turkish infantry battalion there are 8 companies of 102 rank and file.

The full complement of a regiment is 2,566 officers and men of all ranks. The complement of a rifle battalion is 838 men and 27 horses. Of the latter 6 are set aside to carry the mountain guns and gun carriages. Sometimes mules take the place of horses. There are two mountain guns with each battalion. They are of steel, on the Whitworth system. In order to fire more rapidly, bronze breech loading guns are sometimes substituted for the steel cannon. These bronze mountain guns have a bore of $5\frac{1}{2}$ centimetres ($2\frac{1}{16}$ th inches). Their weight is about 100 kilogrammes (6 poods and 4 lbs = about 220 English lbs), their extreme range is about 5000 metres (2,343 sajens)=about 5,467 English yards !!!*

In the Turkish army there are no Cavalry divisions, and generally speaking, as will be seen, there appears to be a palpable insufficiency of this branch of the service. Every Cavalry brigade is composed of two regiments and each regiment, is made up of 6 squadrons. The numerical strength of a squadron is 155 officers and men of all ranks, with 166 horses. In a regiment there are 965 officers and men of all ranks, with 1,044 horses.

The Turkish field artillery is divided into regiments, the strength of which is not uniform, but depends on the number of batteries.

An Artillery regiment consists of 4 battalions, in each of which there are ordinarily 3 batteries. Besides the above there are a few separate batteries forming independent commands. The three batteries of the 1st battalion are horse batteries, the remaining nine are foot. The additional batteries alluded to above, are either furnished with Mountain guns or Mitailleuses. The complement of a battery in time of war is as follows :—In the horse batteries there are 168 officers and men of all

* NOTE.—The guns with our own Mountain Batteries in the P. F. Force have an effective range of 2000 yards only.

TRANSLATOR.

ranks, with 87 saddle and 150 draught horses. In a battery of foot artillery, there are 166 of all ranks with 25 saddle and 150 draught horses. In a mountain battery there are 111 men with 25 horses and 54 mules. The complement of the Ammunition train is 120 men with 36 saddle horses.

The full strength of an artillery regiment of 14 batteries, in time of war, is fixed at 2,436 men, 2,637 horses, and 119 mules, field guns, 4-pounders, (bore 8 centimetres) 36. 6-pounders (bore 9 centimetres) 36. Mountain guns 6 and mitrailleuses 6.

An insufficiency of Sappers and Engineers is likewise observable in the Turkish Army.

The first Corps d'Armée only has two regiments of engineers, one of these is formed of two battalions of sappers and one pontoon battalion, the other regiment has two sapper battalions only. Each battalion is divided into 8 companies, the strength of a company is 6 officers and 181 men of all ranks.

In M. Zboinski's book interesting details have been collected, relative to the composition of the regular forces (Nizams) that, with the aid of a call to arms of a portion of the reserves, (Ikhtiyáti), have been mobilized.

In each one of the 7 Corps d'Armée there are 45 line regiments and 138 battalions with a total of 117,560 officers and men of all ranks 43 rifle battalions with a total of 35,934 officers and men of all ranks, and 86 mountain guns, or a grand total of 153,494 officers and men of all ranks.

The Nizam Cavalry of the 6 Corps d'Armée (for the 7th has no cavalry) is made up of 25 regiments or 145 squadrons numbering 23,407 officers and men with 25,327 horses.

The Nizam field artillery on a war footing, is composed as follows.

In the 8 artillery regiments there are 24 horse batteries, 77 batteries of foot artillery, 11 mountain batteries, and 6 batteries of mitrailleuses. The total number of officers and men is 20,365 with 318 (4-pounders) (8 bore) 288 (6-pounders) (9 centimetres bore) 66 mountain guns, and 36 mitrailleuses. The total number of saddle, draught and other horses in the 8 artillery regiments is 21,658.

The above remarks apply to the Nizam field artillery. With regard to the Nizam garrison artillery it may be said that on a war footing this may be computed at 157 garrison companies, composed of 23,550 men, exclusive of some 7,500 artisans. The number of guns of this class is 3,411. The Nizam Engineer forces are inconsiderable; amongst the seven Corps there are altogether 47 companies numbering 8,789 men.

Reckoning then the whole of the Nizams, mobilized with a portion of the reserves (Ikhtiati) we find in the seven Army Corps.

INFANTRY. 181 *Battalions*.—Strength 153,494 men, 4,450 horses, and 86 Mountain guns.

CAVALRY. 145 *Squadrons*.—Strength 23,407 men, and 25,327 horses,

ARTILLERY. 118 *Batteries*.—Strength 20,365 men, 21,658 horses, 1,129 mules, 708 guns, and 207 Garrison companies with 10,685 men and 3,411 guns.

ENGINEERS. 47 *Companies*.—Strength 8,789 men.

The total of all the branches amounts to 237,105 men, 52,564 horses and mules, with 794 light and 3,411 heavy guns.

M. Zboinski gives minute details concerning the organization of the Control Department of the Turkish Army. But since in Turkey the arrangements which are so carefully made up in offices, in time of peace, are far from being practised in time of war, we will pass by in silence the information given to us by M. Zboinski, feeling assured that not one of the dispositions so made have ever been put into practice, and that the Turkish Army either forages for itself on the spot, or more often suffers hunger, for the whole victualling thereof depends on circumstances, and the degrees of activity displayed by the Control Department. In like manner the pay, received by the officers of the Turkish Army, may be put down as purely fictitious. For, as is well known, those serving in that army have long ceased to draw pay.

Much more interesting are the particulars given of the equipment of the several parts of the Turkish Army.

In the opinion of M. Zboinski the equipment of the Turkish Army leaves nothing to be desired.

The infantry is armed with rifles on the Henry-Martini system, (the Americans call this system more properly the Peabody-Martini,) and with saiders.

The people (Zaptis) about Constantinople, and the neighbourhood, have received also breech loading rifles on the Winchester system. The other portions of the army are equipped with sighted rifles of the same class. The author of the brochure makes however, a mistake in affirming that rifles on the Martini-Henry system have been issued exclusively to the forces in European Turkey, and that the Sniders have been confined to the army operating in Asia Minor. This is perfectly inaccurate, since, both in Asia Minor, and on the Danube, lots of rifles on both systems have fallen into the hands of our soldiers. It is apparent that such a reasonable allotment was intended, but the exigencies of supply upset these wise designs.

Rifles on the Snider system, of English manufacture, are provided with a bayonet of yatagan shape, and those rifles on other systems which have been converted in Turkish work-shops into Sniders, have the saw bayonet like the Martini-Henry rifles. Every soldier carries in a cartridge case 60 rounds and besides these he has in a bag 40 more.

The Cavalry are armed with sabres. Of the 4 Cavalry regiments which are attached to each army corps, the first and second dragoons, (Eider ?) are armed with repeating carbines, Winchester system, and with Lefauchaux revolvers. The 1st and 6th squadrons of the two regiments have Winchester carbines with 12 chambers and also revolvers. The men of the remaining squadrons are armed with lances and revolvers.

Very interesting, if only it is trustworthy, is the information relating to the armament of the Turkish artillery.

The Siege and Garrison Artillery park comprises guns of many and various patterns.

For instance, there are Cast-iron smooth bore guns with a bore of 9 centimetres, pattern of the year 1832. Cast-iron Howitzers with a bore of 28 centimetres. Bronze smooth bore guns with a bore also of 9 centimetres, of German manufacture, of the year 1842, short bronze guns, bore 12 centimetres, of German manufacture, of the year 1862, and similar guns with a bore of 15 centimetres of the year 1858. Side by side with the above will be found bronze breech-loading cannon on the Krupp system, of 12 centimetres bore, also Howitzers, with a bore of 15 centimetres. Guns of the newest patterns are also met with. For example there are steel Krupp guns, built up in coils, of 21, 23 and 27 centimetres bore. There are Cast-iron 23 and 28 centimetre mortars, and also bronze mortars, with bores of 15, 23, and 28 centimetres.

Equally varied are the patterns of the field artillery guns. There are German 4-pounder and 6-pounder bronze guns, on the Varendorff system, with a bore of 8 centimetres and 9 centimetres respectively. The field artillery is however for the most part armed with 4 and 6-pounders Krupp steel guns. There are too some 4 and 6-pounder steel guns on the Krainer system. Finally there are 4 and 6-pounder steel guns, built up in coils, with which it is intended to replace the Mitrailleuse.

The existing Mitrailleuse batteries are distributed over the several army corps. The Mitrailleuses are on the system long known as Montigny.

The Mountain Artillery is composed of steel Whitworth guns and of Krupp bronze guns of $5\frac{1}{2}$ centimetres bore.

The whole of the guns, of large calibre, which have been procured exclusively from Krupp's manufactories, and furnished to the Turkish

fortresses, are reckoned at 1,000. Of these the heaviest are mounted on the fortifications of the Bosphorus, the Dardanelles, Varna, Sinope, and the island of Crete. Others, with a bore of 12 and 15 centimetres, have been placed in the fortresses of Anatolia and Roumelia.

With regard then to the number of guns of all patterns and calibres, beginning with the smooth-bore and rifled muzzle loaders, and passing on to the breech-loading cannon, it is apparent that the resources of Turkey are great.

M. Zboinski estimates the stock of weapons in Turkey, of the various shapes and sizes, to be 2,659,155 pieces. But scarcely 1,972,000 of these could be placed in the theatre of war. The muzzle loading weapons of course could be used by such forces, as are employed to preserve order, in localities not affected by the war.

To the above must be added the 600,000 rifles on the Martini-Henry system which are on their way from America.

The Circassians, Koords and Arabs have likewise been supplied with Winchester carbines.

Even if this number of rifles had not actually been at the disposal of Turkey at the time the war broke out, the equipment of her infantry would nevertheless, have been good and sufficient, but the task of furnishing her soldiers with enormous quantities of cartridges cannot be an enviable one.

With regard to "the equipment and supply of the Turkish soldier," many interesting details have been furnished by M. Zboinski, from which one *cannot* come to the conclusion that the Turkish soldier is in rags and tatters.

In the army of Turkey there exists a General Staff. In peace time this staff is divided into the following separate sections: Surveyor General's, Topographical, Historical, Statistical, and Administrative which deals with the organization of the army, and draws up plans of a campaign and for the line of march.

In war time the sections of the General Staff are reduced to two only, viz., the Historical and the Administrative Staff which exists in Anatolia and Roumelia. The General Staff of each Army Corps is composed of one General of Brigade, one Colonel, one Lieutenant Colonel, one Squadron Commander and seven Adjutants with the rank of Major or Captain.

The Záptis or Gendarmerie are a numerous body. They are composed of both Cavalry and Infantry and are wholly independent of the Minister for war. A Battalion of dismounted Gensdarmes has a complement of 960 men, and a squadron of horse of the same body, numbers 144 of all ranks. The horse and foot Gensdarmes are distributed over the many Wilayets of the Empire and have a total of 117,504 men.

The real strength of the Turkish army lies in its reserves. These, by the law of 1869, are divided into:—

- (1) The reserve proper or Redifs of the two first calls to arms.
- (2) The reserve army of the second class or the Moostahfiza, composed of the 3rd and last call to arms.

In M. Zboinski's book, detailed regulations relating to this part of the army are given, viz. as to its formation into circles and districts.

From the tables which have been therein presented to us, it will be seen that the Turkish Government can, by mobilizing these Redifs, at once make use of reserves completely ready to be embodied in the ranks of the line forces. The number of such reserves is here given.

	<i>Battalions.</i>	<i>Effective strength.</i>
Reserve of the 1st Category and of the 1st call (the Redifs Sinif Meggoden) (?) ...	143	119,200 men.
Reserves of the 1st Category and of the 2nd call (the Redifs Sinif Tali) ...	144	115,200 „
Reserves of the 1st Category and of the 3rd call (the Redifs Sinif Salis) ...	136	108,800 „
	423	343,200 men.

There then follow the Cavalry and Artillery reserves.

The former number 25,412 men and the latter 45,732 men.

Besides the above there are—

Reserves of the 2nd Category and of the 1st call (the Redifs Sinif Meggoden) ...	228	182,400 men.
Reserves of the 2nd Category and of the 2nd call (the Redifs Sinif Tali) ...	183	146,400 „
Reserves of the 2nd Category, 3rd and last call (the Redifs Sinif Salis)	467	373,600 „
	878	702,400 men.

The whole of the reserves then number 1,116,744 men. Of course the present Campaign will show what dependence can be placed on the reserves of the last calls, in the sense of their preparedness for war. For the prosecution of this war, Turkey has already had to put to the test all her last resources, and further in order to confront our forces with as large an army as possible, she has strengthened her reserves by calling to the standard, by means of a levee "en masse," some 144,000 additional men, raised in those provinces which hitherto have had the privilege of not furnishing soldiers for the purposes of war. These provinces are Bosnia and the Bagdad Vilayet. By this step 180 battalions of Infantry have been added to the Turkish army. There like-

wise have been embodied 200 Field Batteries of the reserve, composed of 1,200 guns, furnished from the Arsenal of Senal Boorna.

Independently of this, the Turkish Government has been obliged to have recourse to an Auxiliary Army, and to force into it, people not belonging to the class of conscripts.

As concerning those unpardonable freebooters, the fanatical Bashi-Bazouks, the author of the pamphlet decidedly declines to give even approximate figures. It is evident that the first duty of the Turkish Government after the campaign will be to take steps to get quit of these scourges. Further on in his work M. Zboinski incorrectly affirms that the Bashi-Bazouks have been employed only in Asia Minor and not on the Danube.

The author says but few words about the organization of the National Guard and of those Auxiliary Forces which the Turks have been obliged to quarter in localities in a state of vassalage to Turkey. For instance, we will take Egypt which has so munificently furnished Turkey with levies and horses, and Turis "which refused to give substantive aid to Turkey." But more ridiculous than all appears the remark that from places such as Servia, Roumania and Montenegro the Turkish Government has abstained, up till now, from demanding contingents for their army.

The author of the pamphlet scarcely makes mention enough of the number of the hospitals and dispensaries, of the insufficiency of medical appliances, and of the utter absence of all order therein. In European Turkey, the Government on the 27th January of the present year gave orders for the establishment of hospitals in Varna for 1,000 beds in addition to the hospitals which have existed since the Crimean War, in Shumla for 750, in Siliestria for 600 and in Rustchuk for 480. It is easy to comprehend how utterly insufficient these hundreds of beds would be, when in the course of a few days for example, in the army of Suleiman Pasha, several thousands of men were slain. According to what the author of the pamphlet tells us, the total of the land forces of Turkey of every kind, viz., Infantry, Cavalry, Artillery, and Engineers, actually mobilized in May of the present year, amounted to 813,435 men, 141,284 horses, 2,012 field guns and 3,411 garrison and coast guns. To the above force must be added an unknown number of Bashi Bazouks, Circassians and Gendarmes.

These figures have of course been taken from returns compiled from sources unfavourable to Turkey. But in any case they give some idea of the resources and contingents on which the framers of the law of 1869 have reckoned.

The particulars, collected by M. Zboinski, of the maritime strength of Turkey, present nothing new. The labours of M. Zboinski are a first attempt to make the reading public of other countries acquainted with the Military strength of Turkey. Judging by official intelligence, every

affair which has resulted in a complete victory for us over the Turks, has shewn a numerical superiority on their side, and on the other hand wherever on the Danube and in Asia Minor we have not succeeded, the same numerical superiority added to their skill in lying concealed, has told in favour of the Turks.

Whilst acknowledging that by the establishment of the law of 1869, Turkey has been enabled to show that she did not mistake her power of calling together and equipping an Army of 800,000 men, it remains only to award honor and glory to our own brave forces, which, though having to confront a strong army and one worthy to be opposed to that of Russia, were nevertheless able to overthrow it, in spite of its numerical superiority ; we can add too in conclusion an expression of the belief that, sooner or later, the Turkish Army will be finally annihilated, of this there can be no sort of doubt.

III.

CAVALRY VERSUS INFANTRY.

BY A CAVALRY OFFICER.

The subject of Mounted Infantry, the uses of Cavalry in the present day and similar questions have lately received such general attention the writer trusts the interest of the subject will lead the reader to excuse the deficiencies of this paper.

It is proposed to treat the subject under two heads. 1st Cavalry against Infantry before the introduction of breech loading arms, 2nd Cavalry against Infantry since the time the latter have been armed with the new weapons. The most concise way of treating the first part is to tabulate the most successful performances of Cavalry against well formed Infantry from 1794 to 1860, give some of the best opinions about Cavalry during that period and then examine the more important question. "Cavalry against Infantry since the breech loader has been supplied to armies. After the great wars of the last fourteen years have been considered, the question will be argued whether Cavalry has fallen from its high estate, and is no longer able to cope with infantry in the open field. This belief has obtained wide credence, and as the writer thinks the experiences of the late war do not lead the careful reader to form such an opinion he has prepared the following paper :—

The following are instances in which Cavalry defeated Infantry between 1794, 1860.

1794 Cateau.—1 Austrian Regiment and 5 British Dragoon Regiments mainly defeated General Chapuis' army 27,000 strong with a loss of 3,000 men and 21 guns.

1794, Cambray.—3,000 French Infantry with 20 guns, formed square to resist 4 Austrian Cavalry Regiments, and were overthrown at the first onset, 2,000 men 5 stands of colours and 20 guns taken, the remaining French almost cut to pieces, a few only reaching Cambray.

1800, Nordlingen.—3 Regiments of French Infantry cut to pieces by the Austrian Cavalry.

1800, Marengo.—Kellermann's Cavalry charge routed the Austrian Infantry who were opposed to Desaix's Division, 200 Cavalry charged 6,000 Grenadiers, and Desaix says, took them prisoners.

1805 Austerlitz.—The squares of French Brigade Schuner and Vandammes Division broken by Russian Cavalry, 1 Russian Lancer Regiment broke the 4th Regiment and took its eagle.

1805 *Wertingen*.—Murat with 3 divisions of Cavalry surprised and defeated Auffenberg's Austrians, 9 battalions 4 squadrons strong, the Infantry were formed in square. The Cavalry took 2,000 prisoners 8 guns and 3 standards.

Auerstadt.—Irving's Prussian Dragoons (1 Regiment) destroyed a square of French Infantry who stood firm and fired volleys into them at 15 paces which brought down 9 officers. The Infantry were cut to pieces.

1807 *Waltersdorff*.—The French Cavalry came down on the Prussian Rear Guard of 5 battalions ten squadrons and 1 Battery H. A. they charged and broke the Cavalry and after a brave resistance cut up the Infantry.

1811 *Albuera*.—Stewart's Brigade cut up by 4 Regiments of French Cavalry who slew or took two thirds of them together with six guns.

1812 *La Serna*.—Three French Squares broken by King's German Legion, 5 Dragoons charged a square alone, broke through and two cut their way out the other side, 1,400 men were taken prisoners.

The German Brigade lost 6 officers 104 N. C. O and soldiers and 113 horses killed and wounded.

1813 *Salamanca*.—Cotton's Cavalry broke Thomiere's Division (these troops were already shaken), formed in several lines, galloped through it, so that it ceased to exist as a military body. The cavalry took 2,000 prisoners and 5 guns, they rode for two miles from where they first attacked spreading terror and disorder in the ranks of the enemy.

1812 *Russian Campaign*.—Two Russian Cuirassier Regiments destroyed the French Voltigeurs of the Imperial Guard in square.

1812 *Borodino*.—Caulincourt's Cuirassiers were ordered to attack the centre of the Russian line, penetrate through it, enter the grand redoubt by its gorge and clear out the defenders who had obstinately resisted the French Infantry. This magnificent exploit they performed cutting the flower of the Russian Infantry, who manned the Great Redoubt, to pieces.

Salinas.—The French Light Cavalry charged the Spanish Army who received them with volleys, ten thousand infantry and artillery fled and when rallied next day 6,000 were found either missing or slain and all their guns fell into the hands of the French. "The English Commissaries went off with their animals, the Paymasters carried away their money chests, the baggage was scattered, and the alarm spread along the rear even to the frontiers of Portugal."

1813, *Goerde*.—9,000 French Infantry with 15 pieces of artillery, partly posted in broken ground and partly in the open, were charged by

the Russian German Legion in the open and the French were utterly defeated with the loss of their guns.

1813, *Haynau*.—General Maison's Division of the victorious French with 8 battalions and 18 pieces of artillery were ridden over and captured by 20 squadrons of Prussians.

1814, *Orthes*.—Lord Edward Somerset made a most successful charge with his Hussars and took 2,000 prisoners. The Infantry were shaken severely before the Cavalry charged.

1814, *Fère Champenoise*.—The forces of Marmont and Mortier were 22,000, of whom 5,000 were cavalry, supported by 84 guns ; these were attacked by the Austrian and Russian Cavalry 22,000 strong, supported by 128 pieces of cannon. Neither carbine or pistol was fired by the allied cavalry. With the sword alone, supported by Horse Artillery they broke the French squares. The prizes of the Battle were 7,000 prisoners, 6 Generals, 80 guns, 200 ammunition waggons. No infantry were engaged on the side of the Allies, but the Cavalry and Horse Artillery by this memorable action determined the result of the whole campaign and opened the road to Paris.

This was the last time cavalry was used as all great cavalry commanders recommend it should be used.

1815, *Waterloo*.—Ponsonby charged the French Infantry columns advancing to the attack on the British Left Wing and with three Regiments, (the Royals, Greys, and Enniskillens) almost annihilated them, the Greys then charged the leading column of the French right brigade and made nearly the whole Brigade prisoners. The Royals and Enniskillens made nearly the whole of another column prisoners.

The Union Brigade was almost cut to pieces by the French Lancers through continuing their charge too far. The result of the charge on the French Infantry was, two columns 5,000 strong had been completely destroyed, 3,000 prisoners taken and 40 guns rendered useless.

The French Cavalry at Waterloo were gallant, well disciplined, well appointed troops, but they failed to obtain any success, for they broke two important cavalry maxims "never to charge Infantry except appearances are favorable" and they charged infantry in position supported by guns in position, their charging ground being up hill. The second maxim "never to make sputtering charges," was quite disregarded by them.

The French Cavalry were brought into action prematurely. They were placed in a bad position exposed to a heavy cannon fire. When their great advance failed they were allowed to waste their strength in sputtering charges.

1818, *Malasinsky*.—A Squadron of the 22nd Light Dragoons and 2 squadrons Madras Light Cavalry utterly defeated 4,000 Mahrattas pursuing them for six miles.

1828, *Koulevscha*.—The Turkish Squadrons cut through three Russian Squares and almost annihilated them.

1846, *Sobraon*.—General Thackwell at the head of the 3rd Light Dragoons rode into the Sikh entrenchments and cut down the obstinate defenders, thus letting the Infantry in.

1848, *Moor*.—General Ottingen with his Cavalry Brigade attacked the Hungarian position, rode over a Regiment of Hussars, destroyed their Infantry, killing and wounding 1,400 men and taking 6 guns.

In the period I have named, the above are only a few instances out of many showing the performances of Cavalry against Infantry. The principal evidences for the statements made, are Histories of the Peninsular War, Napoleon's Correspondence, Sir R. Wilson, Nichol, Alison, Sibbome, &c., &c. and the few following extracts show the opinion of great commanders and strategists as to the use of cavalry during the 1st period.

Napoleon said that, "Cavalry charges are equally good at the beginning, middle and end of the battle. They should be made as often as possible on the flanks of the infantry, especially when the latter are engaged in front." Napoleon also asserted to Las Cases, that Cavalry, supposing the men on both sides to be equal in number, equally brave, and equally well led, must always break infantry. Wellington remarks. "Cavalry is essentially an offensive arm whose use depends upon its activity." "Nothing can be more useful in the day of battle than a disciplined cavalry and nothing more useless than a body of regular cavalry half and insufficiently disciplined." Jomini writes as follows : "La Cavalerie pourrait être lancée avec succès pour prendre la ligne ennemie en flancs ou à revers, au moment d'une attaque sérieuse que l'infanterie executrait de front. Si elle est repoussée, elle peut revenir au galop se rallier à l'armée, si elle réussit, elle peut causer la ruine de l'armée ennemie.

Cependant il est un cas où la cavalerie a une supériorité décidée sur l'infanterie ; c'est quand il tombe une pluie ou neige battante qui mouille les armes et prive l'infanterie de son feu : le corps d'Augereau en fit une cruelle épreuve à Eylau et la gauche des Autrichiens eut le même sort à Dresde (note, Jomini's argument concerning the effect of rain applies now to the case of Infantry without cartridges.)

Colonel Hamley says : "Let us grant also that bad cavalry, when the lines are about to close, had better get out of the way, that merely respectable cavalry will, while supporting the other arms effect nothing that can be considered decisive of a battle. But let it be granted that cavalry properly trained and led may play as great a part as ever on the stage of war. Combined with new and larger proportions of artillery its action may be decisive of the fate of battles and launched in

pursuit of a beaten foe it may finish a campaign which would else wade through fresh carnage to its woful end."

Colonel Mitchell when reviewing the period I have named, writes, Cavalry ought always to break an Infantry Square if well led and mounted.

The ablest commanders and strategists were almost to a man of the opinion that the "crushing" power of cavalry remained uninjured at the end of the first period I have named, viz to the period the breech loader was introduced. We now come to the time and lessons which have taught the British public that the "crushing" power of the cavalry has departed, that the white arm can no longer hold its ground when the lines of armies close, that the strong and terror striking sabreur is but a "veil" to his brother on foot, his work but the jackals, his strength but as weakness, compared with the infantryman or mounted rifleman. One of the teachers of the new doctrine, Colonel Havelock, laughs at the Cavalry soldier as a "relic of mediævalism" and finds his "new light" on the teaching of the American Civil War. That any lesson concerning cavalry can be learnt from a war in which no cavalry were used, as cavalry, appears doubtful and to arrive at the conclusion from the experiences of such a war, that cavalry have become useless, seems hasty. To show that the American Horsemen were not cavalry, in the sense that cavalry officers speak of cavalry, it will be advantageous to quote the opinions of some eminent writers on the American War. Colonel Chesney remarks "But in plain fact their arm of the service was but following what had become the practice of the cavalry on either side, in avoiding any attempt to take their place in the general line of battle or even to keep near enough to influence its results. The causes of this conduct are greatly chargeable to the very inefficient training of the individual troopers and their want of unity in movement—difficulties which no officer of either army has ever succeeded in overcoming. But it is probably as much from the nature of the country as from defective discipline, that this arm has in both armies been of very little service in the greater actions: and from feeling, under such circumstances, the hoplessness of any bold attack made on infantry, even though disordered, the cavalry Generals have allowed their squadrons to take up a desultory skirmishing mode of fighting most detrimental to their usefulness and likely to be confirmed into an evil tradition. Such was once the custom in the European armies until Frederic the Great broke through it and introduced one of the greatest of modern tactical improvements by compelling his cavalry to charge the enemy at a gallop and use their swords rather than their fire arms. Another such a disciplinarian backed by power of a despotic nature is needed to revise the system in America before the Northern or Southern horse (for Stuart himself invaluable on outpost duties, has in this matter failed as much as other leaders) can emerge from the contempt in which they have fallen." Colonel Chesney then proceeds to show that had either party possessed cavalry the war would not, to quote Colonel Hamley's appropriate words, "waded through fresh carnage to its woful end," but when the Generals

in Chief only possessed instead of cavalry, men, "whose value has become but that of a party, of mounted infantry and whose tactics are reduced to plunder and destruction" what could they do? Meade was unable to press his victory at Gettysberg and Johnston and Lee their successes of Bullrun and Manasses. A few instances of the use of the so called Cavalry in the American War may be quoted and they will suffice to show that the American mounted branch can only be treated as mounted infantry and do not enter into the question of Cavalry or Infantry. "General Sheridan with 12,000 Horsemen and 17,000 Infantry pursued the Confederates and came up with the rear guard 8,000 strong; this force was utterly demoralized, without guns, desperately fatigued, armed with muzzle loaders, and had not been supplied with rations for days. The following is the success those horsemen in pursuit of a broken demoralized foe, obtained. Their General's own words are" I felt so strongly the necessity of holding back this large force of the enemy that I gave permission to General Meritt to order Colonel Stagg's Brigade to make a mounted charge against their "lines" (hastily run up rail fences) which was most gallantly done, the men leaving many of their horses dead "*almost*" (the italics are the writers) up to the enemy's works. These Horsemen did no more than make this "gallant" charge when the Infantry came up and of course made short work of these miserable fugitives. About this exploit Colonel Sir H. Havelock in his "Three questions of the day" writes. The mode in which Sheridan from the special arming and training of his Cavalry was able to deal with this rear guard, first to overtake it in retreat then to pass completely beyond it, to turn, face it and take up at leisure a position strong enough to enable him to detain it in spite of its naturally fierce and determined efforts to break through, is highly characteristic of the self reliant all sufficing efficiency to which at this time the Northern Horsemen had been brought. Colonel Havelock is one of the most violent teachers of the "new light on cavalry school" and does not usually write satirically but it is hard to believe he did not pen the above lines on the American Horsemen in satire when he had a few pages previously referred to their "gallant" charge where they had actually some of their "horses" killed near the enemy.

Another instance may be quoted with advantage. In the action near Peterborough Sheridan had under his command 25,000 men, the confederates 15,000 the latter were completely and utterly beaten, their infantry disorganized and rushing to the rear in mad flight, when a "dashing" charge of 10,000 Horsemen was made and in the words of the General "the fugitives were by the quick action of the cavalry driven off westward according to the original idea." 10,000 Cavalry pursue a beaten routed infantry and they are driven off "westward according to the original idea" !! Shades of Seidlitz, Ziethen, Kellermann, Anglesea hear ye.

In order to show what cavalry could accomplish under the like circumstances the following account of the action of Monterey (1809) is extracted from Napier.

"As the French advanced, the Spaniards abandoned their positions in succession, spiked the guns in the dilapidated works of Monterey, and after a slight skirmish at Verim, took the road to Puebla de Senabria but Franceschi followed close and overtaking two or three thousand as they were passing a rugged mountain, assailed them with a battalion of infantry, and at the same time, leading his horsemen round both flanks, headed the column and obliged it to halt. The Spaniards trusting to the rough ground drew up in one large square to receive the charge. Franceschi had four Regiments of cavalry ; each regiment settled itself against a face of the square, and then the whole with loud cries bore down swiftly upon their opponents. The latter, unsteady, irresolute, dismayed, shrunk from the fierce assault and were instantly trampled down in heaps. Those who escaped the horses hoofs and the edge of the sword became prisoners ! but 12,00 bodies were stretched lifeless on the field of battle."

Colonel Denison remarks that he was told by many of the American Generals that their Cavalry were next to useless against fire arms, if mounted, they only believed in themselves when dismounted. According to the testimony of many writers the American Horse never attempted to charge in line and the so called charges of Williamsburg, Gains Hill and Kelly's Ford were only wavering advances of confused rabble of horsemen. The North refused to believe in mounted men and commenced the war almost entirely without that arm, it was only when harassed and hunted by Stuart's Horse that they discovered it was expedient they should have the power to annoy their enemy in like manner. Then it was that they mounted a vast body of men and expected them to be of as much use to them as cavalry—all cavalry officers are aware it takes from one to two years to make a decent cavalry soldier when trained under able officers and by a good system. The Americans had no cavalry officers to speak of and as for system apparently there was none, thus without training their mass of horsemen never became cavalry. A campaign which makes the Infantry soldier steady, self possessed and reliant will most probably spoil even the little good there is in a Cavalry Recruit Regiment. By reason of the want of training, the recruit on a horse is a perfectly helpless creature both for offence or defence, he tumbles in everyone's way and is more dangerous to his friends than his enemies. No sort of reliance could be placed in a Recruit Cavalry Regiment by a General and this want of confidence re-acts on the Regiment, and it is a well known fact that once the self confidence of a Dragoon is destroyed the sooner he is dismounted the better. Fighting as a rabble became a fixed system with the American Horse and the tactics of cavalry were not directed to surrounding and cutting off infantry and guns but destroying Farm Houses and Grainaries. To write at such length on this American question would not be necessary had not such books as the "Three Military Questions of the day &c., &c." been written advocating the abolition of cavalry as, by the experience of the American War they had been shewn to be useless, and further endeavouring to prove, by the example of the Americans, that

mounted infantry had superseded the use of Cavalry—After reflecting on the above, perhaps the reader will agree with the writer that it is not necessary to include the American Horsemen, when engaged in considering the question of Cavalry versus Infantry and that if those Horsemen must be allowed to be Cavalry then they were such Cavalry as the Great Duke meant when he said "nothing can be more useless than a body of regular cavalry half and insufficiently disciplined," and Colonel Hamley pointed out "as the bad Cavalry who ought to get out of the way when the lines are about to close."

The American Horse carefully followed Colonel Hamley's advice and in so far showed the wisdom of their leaders.

The majority of writers agree that the American Mounted Infantry were a highly useful body as infantry and no doubt, any General would be pleased to have a division of such Infantry accompanying his Cavalry but then it must be borne in mind that this new arm would be the most expensive in the whole service. The American Horse had an average of three horses per man served out to them in six months, and it may fairly be questioned if the usefulness of their mounted infantry was as great as the vast number of infantry the state could have paid for out of the enormous sums lost to it though the inefficiency and neglect of their ignorant Horsemen. So vast was this loss that the American Secretary of State writes that had all the army suffered the same as the army of the Potomac, the North required 435,000 remounts annually. If mounted infantry could be made less expensive they would be a highly useful body to attach to Field Batteries, as the latter work so fast in the present day that infantry escorts become exhausted and if the Field Batteries work up to the line of infantry, both infantry and cavalry are necessary as escorts for the guns. These mounted riflemen would of course be trained as gunners in order to supply casualties and the battery would be rendered much more independent than it is at present. If corps artillery was pushed to the front, these mounted infantry would be valuable as a defence against cavalry. The experiment might be tried in India where there is a cheap and hardy breed of horse available.

The campaign of 66 has now to be considered—and the lessons to be learnt from it are few, when the special question of cavalry against infantry is under consideration, for the cavalry were kept so much in hand for strategical purposes and the tactical cavalry were so few in number they were unable to take advantage of the many opportunities given them. The only time the strategical cavalry were used with advantage by the Prussians was at Rokeinitz (15th July) and then they had been so marched and countermarched that 24 strategical squadrons could only muster seven squadrons for the field. It was remarked in the /59 campaign that the out post and scouting duty of the Austrian Army was exceptionally bad in the cavalry branch, but the campaign of /66 showed that this ignorance was not confined to the Austrians alone, for among many other instances that occur, one may be mentioned On

the 2nd of July /66, the Prussian army was one mile from the Austrian army without being aware of the fact—and in many instances the touch of the enemy was entirely lost, witness the complete ignorance of the Austrian commander of the advance of the Prussian army till attacked at Chlum. In covering the retreat of their army at Sadowa, the behaviour of the Austrian cavalry was worthy of all admiration but the gallantry of the men is more evident than the skill of their commanders.

The following combats are worthy of note :

Langenzalza 27th June /66.—One squadron under Captain Einen (Hanover) charged two guns and a company of infantry, in an open plain and in spite of two volleys from the infantry and heavy canister fire from the guns, he broke in on them, sabred the horses and men and took the guns. In this action two squares of Prussian Infantry were broken by the Duke of Cambridge's Dragoons and all not slain made prisoners. These squares poured their far famed quick fire into the Dragoons, but the breech loader did not save the squares from very heavy loss though it is said the Prussians stood most bravely. During this action a squadron charged up to a square and received two withering volleys and were beaten back only leaving 2 officers and 16 men on the ground.

Tobitschau 15th July.—Colonel Bredow with the 5th Currassiers advanced over open ground and attacked the artillery, the Austrians stood to their guns and fired round after round into the Cavalry as they advanced. The Austrians were cut down at their guns and 18 guns, 168 horses and 170 prisoners were taken by this Regiment alone with the loss of 12 men killed and wounded.

Rokeinitz 15th July.—2 Squadrons of Landwehr Hussars broke an Austrian square, cut down the greater part and took 300 prisoners. In this action also the Prussian 2nd Hussars cut up the 33rd Austrian Regiment in square and took many prisoners. There were several other squares broken and the total loss of the Prussian Cavalry in the actions of Tobitschau and Rokeinitz was 10 killed and 95 wounded some of these being killed in cavalry combats.

Dluhonitz.—The Austrian Infantry in vain attempted to form company squares they were clean ridden over by the Prussians. It must be recollectcd the Austrians were not armed with the breech loader.

Nachod.—There were instances in this action of Austrian squares being ridden over by the Prussian Cavalry, but as they were not armed with the breech loader it will serve no purpose to quote them, but it may be of advantage to remark that where several squares were broken by one Regiment the loss of it during the whole day was 3 officers and 8 men killed, 6 officers and 33 men wounded.

Gitschin.—The Austrian Cavalry were little used except to cover the retreat of their infantry. There was a mad attempt made by the Austrian Cavalry to charge Prussian Infantry in a burning village.

Sadowa.—The swampy nature of the ground rendered the use of cavalry difficult, some regiments however managed to distinguish themselves during the fight. The Austrian Cavalry on the lines closing were again kept back to be used for the purpose of covering the retreat, the whole Prussian Cavalry Reserve under Prince Albert, through a mistake in orders, was sent off in support of the Army of the Elbe and was consequently not available for the day's fighting, by the absence of the Prussian Cavalry Reserve the Austrian Cavalry were able to make the noble stand they did and save their army. In the grand Brigade of Cuirassiers only 10 Austrians escaped unwounded; from ridge to ridge they stood, and fought like the good men they were and delayed the Prussians so long that many authors have wondered at the extraordinary slowness of the pursuit of the beaten Austrian Infantry. When troops like Baine's Cuirassiers are covering the retreat of their infantry and heavy guns, the slowness of a pursuit need not excite anyone's surprise.

Very little comment is necessary on this campaign, from it the Prussians learnt first, that the position of their cavalry must be changed, reserve cavalry marching in rear were changed into independent Cavalry Divisions and marched ahead or on the flanks of the army doing light cavalry duty: secondly, that sputtering charges without proper support and in difficult country were worse than useless, thirdly, that their cavalry was of little or no use as a "veil" by reason of their ignorance of out post duty; fourthly, that the army with the largest and best force of cavalry won the campaign in modern warfare and therefore their cavalry must be largely increased and better instructed; fifthly, that the "crushing" power of cavalry remained when the lines had closed, therefore their heavy cavalry must be made more powerful than ever. Sixthly, that the Austrians committed a fatal mistake in waiting for cavalry charges at a halt and using their fire arms; seventhly that greater attention must be paid to making their cavalrymen better horsemasters: Eighthly, the size of the horse increased and the weight decreased and details studied with more care. Taught by the experience of /66, we shall see how different the Prussian Cavalry became in /70.

Worth 6th August /70.—General Lartigue in order to free his flank deliberately sacrificed his Brigade of Cavalry, he ordered General Michel to advance with his brigade over ground covered with stumps of trees intersected with deep ditches and watercourses, and attack 6 battalions of Prussian infantry posted on the heights of Mortbrunn and in the streets of that village. When the Brigade reached the Prussians, it is needless to say they were thoroughly disorganised by nature of the ground they had passed over, nevertheless, they broke through the Prussian Infantry only to find themselves charged in flank by the Prussian Cavalry and driven back with great slaughter. This sacrifice of a cavalry brigade was useful to the French as it enabled their extreme right wing to retire to Eberbach. As this particular combat is frequently referred to by the advocates of keeping cavalry out of the way when the lines close and as they say, clearly demonstrating the inefficacy of

cavalry against infantry with breech loaders it may be as well to point out that because General Lartigue was ignorant of what could be done with cavalry, it is no argument in favour of the infantry. No cavalry officer of mediocre ability even would send a brigade 1,000 yards in the open, over unreconnoitred country to attack four times their number of infantry in position on the side of a hill and supported by cavalry. It is as well to say that in English opinion the formation of the French advance was also faulty, the 8th Cuirassiers were in column of squadrons in the first line, the 9th Cuirassiers in line, the 4th Lancers in column of divisions in rear of the 9th Cuirassiers, in all 1,000 sabres. The above account is taken from the German official account which is not likely to favor the French cavalry commander. In this action the French broke one of the maxims of Cavalry never to attack Infantry who have taken up a position and are only waiting for you to come on.

Worth.—Colonel V. Bernouth with 5 Squadrons and a battery of Prussians attacked Gundershoffen drove out the infantry and took 13 officers 186 men 1 gun 240 horses, &c.

Worth.—2 Squadrons of Wurtemberg Cavalry attacked Reichshofen which was barricaded and occupied by the French infantry. The two squadrons took all the infantry prisoners, together with a standard, later on these same squadrons captured a battery which poured round after round of grape into them as they advanced.

Worth.—Bonnemains attack on the Prussian position was similar to Michels, the ground being much the same. The French Infantry had been routed after twice endeavoring to take Elsasshausen, Bonnemains cavalry were then ordered to advance and take the village, the heights being occupied by 9 Regiments of Prussian infantry, 3 heavy batteries 2 H. A. batteries and 3 light batteries. The 1st Cuirassiers made their way to within 500 yards of the enemy but were there stopped by a deep gully and had to return. The 4th Cuirassiers could not get within 900 yards. The 2nd Brigade were more fortunate as after infinite trouble and picking their way under a heavy fire, they did manage to reach the enemy and charge in small groups and then retreated leaving 211 officers and men on the ground. The calculations of breech loading fire must be quite inaccurate or not one troop of this, 2nd Brigade would ever have survived to tell of this silly attack

Vionville or Mars la Tour 16th August /70.—The Chasseurs d'Afrique charged a battery supported by infantry took it and drove off the riflemen. While carrying off the guns they were charged in flank by the Prussian Hussars and as supports arrived a cavalry fight ensued. The French took a standard and 2 guns.

Vionville.—The 3rd German Corps after a bold attack of cavalry were pressing the French left and it became necessary to stop their further advance. The French Brigades of Bataille and Valazé had been put to utter flight, so the usual French practise of endeavoring to retrieve

disastrous infantry defeats by mad charges of cavalry was then pursued. General Frossard ordered the Cuirassiers of the Guard, and the 3rd Lancers to charge the victorious Prussian Division in the village of Vionville. General du Preuil remonstrates pointing out the distance to be traversed under fire, the broken ground, the masses of infantry in position, the danger of a flank attack from the Prussian Cavalry, all are disregarded and with the fatuity displayed by all the French Generals when dealing with cavalry in this war he is ordered forward. Two squadrons of the 3rd Lancers are sent forward to reconnoitred and return with the information, there is nothing to charge, the enemy are all under cover but again the order is received "the cavalry must turn out the enemy," so General du Preuil attacks with two squadrons in the first line, two in the second line and a fifth squadron in the 3rd line. The ground is broken 'covered with baggage waggons' and every description of camp equipage, therefore keeping any sort of line is an impossibility but the gallant cuirassiers charge and are received with a tremendous fire by the 52nd and 12th Prussian Regiments and a flank fire from the 6th Infantry Divisions. They reach the infantry though and cut down the 52nd leader but, are at the same time charged by 4 Squadrons of Prussian Cavalry. Would any one who has looked on at experimental firing believe that 400 of that gallant 600 cavalry escaped unwounded. No French Commander of the old war ever used his cavalry in the infatuated way the cavalry of Bonuemaire Michel &c. were used in this war, flashy charges of some 800 or 1,000 cavalry without proper supports made thousands of yards across the open, exposed to fire over unrecognised ground, attacking unshaken infantry in position are mistakes which to say the least are lamentable. Yet it is from such mistakes that certain theorists deduce the argument that the "crushing" power of cavalry has departed, happily there are other instances even in this battle to contradict such fallacious reasoning and the following is one :

Vionville.—About the 3 p. m. was the crisis for the Prussians and it was imperative that the enemy's batteries on the Roman Road should be silenced, this could only be done by trying the crushing power of the cavalry against the breech-loading guns and rifles. The Chief of the Staff of the 3rd Corps d' armée rode up to a Brigade of cavalry consisting of 2 Regiments of Dragoon Guards and one of Cuirassiers and gave them the order to clear the way, the Brigadier said "am I to understand that cavalry is to break through infantry and artillery here by the wood "certainly" is the answer "we have already taken the hamlet but cannot reach the wood so the issue of the battle depends upon you clearing away everything along the Forest." Under an overwhelming fire of artillery, Von Bredou advances with his gallant heavy brigade. At close range the Brigade of 6 squadrons receives a withering fire of infantry and artillery, but the infantry are ridden over and the gunners and teams put to the sword ; a second line of infantry is encountered and share the fate of the first, but the gunners in their rear taught by the fate of their comrades in the first line, limber up and

betake themselves to flight. Here that gallant charge ought to have finished, the rally and recal is sounded, but who is going to stop after years of being kept in the leash, the heavy cavalry have been let go, and they mean going, they find from their own experience that in spite of all they have heard, the invincible strength of Seidlitz's troopers remains to them and the joy of being let go is too much for their steadiness. The trumpet call is disregarded, on go the Brigade cutting and slashing all before them, till after a joyous career of more than a mile and a half they find themselves face to face with the French Cavalry (well in rear as usual till required to be sacrificed,) the brave brigade is charged by the French Cuirassiers but is gallantly rescued by the Prussian Hussars who have been sent in support of the Heavy Brigade. The recal is sounding and now it is obeyed, the hot blood is cooled a little, the heavy cavalry has shown what it can do against the modern weapon which had promised to annihilate it but again have the French infantry to be ridden through for they have formed in rear, and again are they ridden through, though the fire with which the cavalry are received is awful, nevertheless it is passed and finally the Brigade reaches where it started from, having lost 76 officers and 363 men, but who grudges them? Right surely none of that gallant brigade; the French advance from Rezouville is stopped, the 3rd Corps d'armee is saved and if the whole, 1900 had been put *hors de combat* the loss would still have been, great gain to their country. To be sacrificed for the sake of ones country as these Prussians were, is as noble a death as a soldier could wish, to be sacrificed as du Preuil's cuirassiers were, on a fools errand, seems almost an ignoble end to a brave career. In this action victory would have been certain if a fresh line of cavalry had advanced as at Würtzburg.

Gravelotte.—In this battle cavalry were hardly used on account of the nature of the ground it was however, employed in a novel manner, once during the day. The Prussians endeavored to take a position on a steep hill which was almost impregnable being crowned with batteries, metrailleuse and thousands of infantry. Brigade after Brigade of Prussian Infantry had been driven back, decimated from the attack when it occurred to someone to order a Regiment of cavalry to attempt the enterprise it is needless to say the horses and men were rolled in heaps down the hill.

Gravelotte.—A French Cavalry Regiment was stopped by a wall in this action and half of them were shot down.

Beaumont.—When all hope was over for the 5th Corps according to the usual plan, a French Cuirassier Regiment was ordered to sacrifice itself before the masses of the Prussian Infantry and did so very gallantly, hardly a man returning.

Sedan.—The French Cavalry charged masses of infantry in position supported by guns and of course suffered terrible loss.

Michel's Brigade of Cuirassiers, (the remains) who made the gallant charge at Worth, cut their way through the Prussian Army and reached Orleans.

Orleans.—The Prussian Cavalry rode over the French infantry and cut them up.

About this period the morale of the French infantry, when opposed to Prussian Cavalry, became so bad that it would not be fair to bring them into the argument of Cavalry versus Infantry.

The Campaign of 1870 has taught the most valuable lessons about cavalry, though the ground over which most, of the actions were fought was unfavorable to the action of cavalry, being broken ground round villages &c. The Prussian Cavalry proved themselves invaluable to their Generals by enabling them to preserve the strategical secret completely concealed and wearing out the enemy by incessantly harassing his rear and flanks. The strength of the Prussian Independent Divisions allowed them always to be close on the enemy, as reliefs were available for scouts and outposts, and enabled them to keep up communication between the armies. The Crown Prince without this large force of cavalry would have been ignorant of the success of the Prince Frederic Charles' movements and must have been hampered by the dread of a flank attack. The stoppage of Bazaines army at Mars la tour was effected by the Cavalry and they thus may be said to have indirectly caused the surrender of that army. There is little doubt that the Prussian Cavalry could never have been so successful as a "veil" had the French Cavalry been used with effect but the usefulness of that body was marred by the little knowledge displayed of the officers of all grades, shown by General officers keeping large masses of cavalry in rear of their armies when the enemy's cavalry was harassing their front and flank, by commanders committing such inexcusable errors as Fortons and De Failly's, and by Regimental officers being ignorant of the commonest knowledge of outpost duties. By the general neglect of officers in not teaching their men good horsemanship, evident by the numbers of uninjured horses captured by the Prussians, when their riders had not been engaged. Bismark remarks when commenting on the Cavalry in the great wars at the commencement of the century. "They never understood in the French armies that cavalry can only produce results by manœuvre; thus neither the physical force of this cavalry—its united masses—nor the high elevation of its moral force was of avail. In consequence of the want of talent to manœuvre, it was placed in the battle as food for cannon and after it had shown the greatest proofs of steadiness and intrepidity single Cuirassier regiments were sent to charge batteries at a slow trot, as if it were glorious to gain every victory with the greatest possible loss." Does not every word of this seem applicable to the campaign we have under consideration. As far back as 1859 the late Emperor strongly recommended his cavalry officers to study outpost duty considering them deficient in this respect and had they obeyed the command in the

slightest degree such a disaster as happened to Forton's Cavalry Division on the west of Vionville could never have occurred. It is a matter of surprise how the French Light Cavalry officers who possessed such admirable teachers as De Brack—to point out the way their duty as Light Cavalry officers should be done; in spite of his lessons, committed nearly every fault of omission and commission of which Light Cavalry officers could be guilty from a whole Division unsaddled and cooking, without outposts, being surprised by Artillery, to an officer charging a 5 foot wall manned by infantry, this want of head knowledge was commented on in "Des Causes, qui ont amené la capitulation de Séダン" which was supposed to be inspired by the late Emperor. Marshal Niel was also well aware of this great defect in the officers, and devoted nearly the whole of "Observations sur le service de la Cavalerie" to this subject. The French Cavalry, to judge by the war of /70, are as brave and enterprising troops against infantry as an officer could wish to lead, and their failure in this campaign is clearly traceable as the fault of their leaders. The French were slow to discover that they wanted something more than "élan" in their officers of cavalry. Had they recognised the fact that next to the Staff and Engineer Officer, the Light Cavalry Officer, ought to be the most highly trained officer in the army, how different might have been the result of the campaign. The defects of the French Cavalry have been dwelt on, for judging by the Campaign of /70, one is almost inclined to attach too much importance to the advantages derivable from using huge masses of cavalry as a "veil," for if the enemy's cavalry are at all equal in mental and physical qualities, little could be effected and it is certainly true that if the enemy's infantry do not retreat these large bodies of cavalry cannot range the country as they did in 1870. It seems evident from this campaign, that Heavy Cavalry in large numbers and well supported, will effect just as great results against the breechloader as they did against the muzzle loader, this could not of course be the case had infantry formations remained the same as in former days, but the loose formations are the Cavalry leaders opportunity. Infantry in the present day are out of hand and in danger of suffering from panic. The quick fire, is not careful fire, thus the results from it are nothing like what might be expected, witness statistics of the late war—there is a great and terrible danger to infantry from waste of ammunition, for a cavalry leader noticing the fire slacken from any particular division of the enemy would immediately charge it, and from such examples as the panics at Gravelotte, there is little doubt what the result would be, the soldier of the present day is much younger and more undisciplined than the soldier of the old wars and is therefore more liable to panic from the action of cavalry, through the want of the steady training of the long service soldiers to put these young soldiers into line formations and company squares to resist good cavalry seems very rash after such a lesson as Vionville. During this war the Prussians were still loth to charge in sufficient numbers and clung to the old prejudice in favor of sputtering charges without proper supports. Who can doubt that the old system of the great Frederick is the right

one, that for anything beyond a mere temporary advantage charges must be made with large numbers, with ample supports, and reserves behind them and the advantage gained seized upon at the moment, by the quick forward movement of the infantry. An article in the "Militaire Wochentblatt" says "At the commencement of the next war large cavalry masses will probably come into contact, for our enemies will take advantage of what we learnt in 1870." The enormous number of horses bought by the Prussians and their present changed tactics for cavalry, clearly point to the fact that taught by 1870, they are going back to the days of Seidlitz and will try charging the enemy in great masses of cavalry with large supports and reserves. In support of this the "Militaire Wochentblatt" remarks that "many Prussian critics hold that the teaching of the war of 1870 clearly shows that the efficiency of cavalry in the close lines of a battle has been fully re-established and that in future wars the Cavalry should be used as in the time of Napoleon and Seidlitz. The reason we have failed hitherto is that our cavalry is not properly trained and we have no general capable of massing and keeping well in hand large bodies of cavalry, that for this purpose a cavalry commander must have genius, and genius is rare." If it is proposed to use Cavalry as in the days of Seidlitz then the "veil" will suffer in proportion, for Cavalry must be kept near the army for this purpose and if cavalry are used in the old manner they will suffer fearfully, but not more or as much as the infantry do at present, of course as to results to be obtained we are in the dark, for no large body of cavalry well led and supported have ever charged for many years."

There is a paragraph of great consequence in the German Official Account of 1870, it says, "of special importance lastly was the great battle before Metz for the cavalry, which after a long lapse of time once again asserted its importance "*in battle*" and found opportunities to attack in large masses. Still the proceedings of the 16th August show that even the boldest and most opportune charges of cavalry can only achieve lasting successes when strong reserves of this arm are at hand." The old saying of Marshal Turenne's was aptly illustrated by the Prussian Cavalry in 1870 "Avec une bonne cavalerie on travaille l'armée de son ennemi par détail."

Effect of Infantry fire.—The idea that cavalry cannot exist when exposed to the fire of infantry is certainly not borne out by facts. Target practice and Field firing are brought forward as examples of the accuracy and rapidity of infantry fire on the field of battle and of the impossibility of cavalry existing before such a fire. If cavalry were exposed to such a fire their loss would no doubt be terrible, but they never are exposed to such a fire. It is a well known fact that infantry armed with breechloaders, when excited, either fire very low or very high, and there is a fascination in seeing a seemingly overwhelming body rushing forward which, men say who have had experience, is not conducive to the careful firing displayed before the target and an enemy of dummies. But of course where all the conditions such as exhaustion, excitement, smoke, and confusion are absent, not even approximate

results can be obtained from field firing. Hozier says speaking of the fire in /66. "The infantry fire did not tell except at close quarters." The most complete refutation of the argument that cavalry must be utterly destroyed before reaching breech-loading infantry is to take the instances of the last wars. If the breech-loader is so effective, how did the Cambridge Dragoons manage to ride over the two Prussian squares at Langenzals, after charging them twice and only succeeding the third time ! If anything like target results of firing were taken not one of those dragoons would have been alive to charge a second time, as it was, their loss was quite small. How was it too, that one man of the Prussian Heavy Brigade escaped at Vionville after riding down two lines of infantry and artillery exposed to a tremendous front and flank fire, during their attack, from hitherto victorious troops. Not even the most enthusiastic cavalryman would argue that Cavalry is the proper arm to send against the three arms in position, or to attack entrenchments, yet this was the novel way the cavalry were used when they suffered severely in the last war, witness Michel's Cuirassiers at Worth ordered to attack the two arms in position, the same with Bonnemain's Cavalry at Elsasshausen. The Wirtemberg Cavalry ordered to attack Reichshoffen barricaded and strongly occupied (this place they took). The Prussian Hussars being sent to crawl up steep rocky heights to the attack of a position from which brigade after brigade of infantry had been repulsed. Cavalry in all the instances quoted were used in the most ruinous manner yet from the returns of killed and wounded, it does not appear they suffered as much as the infantry. The percentage of killed and wounded in battles is steadily on the decrease since the introduction of breech-loading arms. Most good judges say that infantry fire is not effective beyond 400 yards and the writer has heard an Officer of long experience, a first rate rifle shot and one of the best shikaries in India declare that he did not believe that infantry fire would be effective against charging cavalry a yard beyond 300 yards, and he would not allow his men to open fire at any greater distance. Cavalry will pass over 300 yards in less than half a minute. A horse, even though mortally wounded, rarely falls to the ground under 300 yards if galloping, so the introduction of the breechloader seems to have made little difference in the number of effective cavalry who would actually charge the front of the square.

Want of ammunition the Cavalry gain.—There is little doubt that the facility of firing the breech-loader is a source of great danger to the Infantry, Maurice says "all agree that the special weakness of the French is a tendency to waste ammunition and to neglect the preparation necessary for providing fresh supplies." At St. Privat the French troops had fired away 90 rounds per man, they then collected the rounds from their dead comrades pouches and having expended all their cartridges finally had to abandon the position. Had an enterprizing Divisional leader of cavalry been watching the fire gradually slacken on that flank, and the troops retiring, what a prize he would have had in his clutch. Mr. G. T. Robinson, the only English correspondent with the French, speaking of Gravelotte says. "At last our ammunition failed us and then the

Generals lost their heads, no supplies of ammunition were brought up. At the same time the 67th stood for three hours right in front of a wood, being leisurely shot down by the Prussians without a single cartouche to fire. Truly do the soldiers say, speaking of Gravelotte, it was not war it was a massacre." At Vionville, Lehmanns Brigade and the Brandenburg battalions had expended every cartridge they had at 2:45 in the day, and had then to abandon the wood. At Spichren, the ammunition at 3 P.M., was almost exhausted on both sides and the French troops on the Heights had to give way in consequence. Many more instances could be quoted. Waste of ammunition seems to be common to all armies armed with the breechloader, already in the present war have the Russian cavalry taken advantage of this new opportunity for cavalry action and we read of a division of cavalry being launched on the Turkish right at Dilibaba, and the Turks having exhausted their cartridges, were cut to pieces.

Moral effect of cavalry greater than ever.—From the time the 93rd received the Russian Cavalry in line at Balaclava a belief seems to have sprung up in our army that the morale of infantry has so much improved that they have now become regardless of cavalry. If this is the case we must all be rejoiced at it, but if the Balaclava affair is the proof of it, surely the belief is not of much account. If the Russians did intend to charge our men, they went about it in such leisurely fashion, that no one could have supposed such to have been their intention. Certain it is, that no fire that a single regiment armed with muzzle loaders, at 200 yards, (they are never said to have been nearer) could have stopped a brigade of cavalry that meant to charge. If it could be shown that they suffered great loss, and were driven back from their headlong charge, by reason of their losses and that the 93rd had stood calmly in line to await a swift charge, it would be some proof that the terror striking effect of a line of cavalry galloping down on them, has ceased to affect our infantry. In 1860, Sir Garnet Wolseley who is far from a cavalry advocate, remarks. "The writer has witnessed more than once the dread entertained by good infantry for cavalry when in action. This must be familiar to all officers who have commanded skirmishers or their supports when advancing under fire. Let there be the slightest suspicion of cavalry charging, let, but a few horsemen show themselves in the vicinity and I have always found it have a most unsteady effect upon the men."

Gravelotte alone would show the increased moral effect of cavalry where a panic similar to that of the battle of Freidlengen occurred. In this battle of Gravelotte, a whole division of Prussians after taking Rezonville, were seized with a panic, abandoning everything they rushed in mad flight to the rear and the officers of the different regiments were carried away in the stream. The fugitives were at last brought to a stand still by rushing on another column, and the officers of regiments then managed to rally and collect their men. Now the cause of this headlong flight was, a few horses had broken loose from the ammunition waggons and dashing

madly through the advancing regiments produced this wild unreasoning panic. What a prize the French cavalry might have seized if, instead of the ammunition waggon horses theirs had been the horses to gallop through these terror stricken infantry. Later in the day at Gravelotte a worse panic seized on the Prussians a cry of "the French Cavalry are coming" was raised, on which artillery, infantry, baggage waggons, ambulances all rushed madly to the rear. The Hon'ble C. Winn, who was a spectator of the scene writes in his book on the war. "The officers shouted themselves hoarse with summoning the flying soldiers to halt, had the French cavalry been there, nothing could have saved this corps from being cut to pieces." This horror and dread of cavalry was not confined to the Prussians for when the French were retreating from Gravelotte in perfectly good order, there was a cry raised that the Prussian cavalry were coming and immediately a yell arose of "sauve qui peut" arms knapsacks everything was flung aside and the special, correspondent who witnessed it says, nothing could have saved Bazaine's army from being annihilated had the Prussian cavalry been in pursuit. Numerous other instances of the great dread infantry still entertain of cavalry, could be brought forward, but those already given, seem amply sufficient to prove the fact.

In concluding this paper two questions arise in the mind of the writer. 1st.—are not loose formations of young soldiers (as ours are becoming) extremely dangerous against masses of cavalry such as the Prussians will bring into battle in the next war. 2nd.—Are our cavalry what they ought to be? Some years ago, when according to the most competent judges our cavalry were better than they are now, Sir John Burgoyne writing with the wisdom of vast experience remarks, "Our Light cavalry are not efficient," again he says "although the officers maintain good discipline and are scrupulously attentive to their duties the cavalry is the least efficient arm of our service in the business of a campaign and in quality as part of an army in the field it is, in some respects, of inferior value to that of any power in Europe," and this he considers is due to the British Dragoon being an indifferent horsemaster. It must be recollect in reading this condemnation that Sir John Burgoyne was an Engineer officer and his opinion on such matters as the management of cavalry, &c., is of about the same value as Lord Anglesea's opinion would be on a matter of military engineering. Cavalry have suffered very much in public opinion by reason of nearly every educated Englishman believing himself perfectly competent to give his opinion on two subjects, the horse and his rider, but he generally gives a more decided opinion about the former than the latter. In consequence of this belief every General of a corps of a division, of a brigade, thinks himself perfectly competent to manage his cavalry, he has doubts about his knowledge of artillery and consults his artillery commander, but he has no doubts about his cavalry, he sends a vague order to pursue this or charge that and is astonished if disaster attends the operation. Cavalry have suffered in another way, from the Englishman's love of horses. The profession has been sunk

in the horse in many regiments and the officer who can tell you the winners of the Derby for the last twenty years is often ignorant of the names of twenty of the men of his own troop. The writer has often seen a man who could tell the weight that was up on a race horse at a glance, but be utterly taken aback when the weight of one of his own men in marching order was asked for. Most military authorities agree that we have the finest cavalry in the world, except, perhaps Colonel Blackett in his History of the United States Cavalry, he says "The English as a general thing are wretched riders and it is no wonder that they are almost universally whipped whenever they go into battle," and he instances the battle of Balaklava "where the English horse was entirely cut to pieces by the Russians." For the information of the reader who has not had the pleasure of reading this droll book it may be mentioned that this quaint historians historical knowledge is about on a par with his knowledge of cavalry. The British cavalry can defy criticism if only used in the close lines of battle. It is when used for strategical purposes that the individual officer has the opportunity of making his arm of the greatest use to the army at large. If any cavalry officer will take the sketches and reports sent into his orderly room, after a days outpost duty, and compare them with a Prussian regiment's, he will see why Sir John Burgoyne talked of the British cavalry being in some respects of inferior value, this blot on our system is however, being gradually but very slowly remedied. When it is, the present British cavalry, will be such cavalry as the world has seldom if ever seen, and with a leader and opportunity may be trusted to accomplish more than cavalry has ever effected before. In conclusion it is hoped the reader after he has refreshed his recollections of the deeds of cavalry during the last eighty years will agree in the following remarks of Bismarck made many years ago. Cavalry will probably in future times only maintain the rank of frigates and will no longer occupy a place in the order of battle, it will only be considered serviceable in reconnoitering, for advanced posts, rear guards, convoys, &c., until some eminent talent on a throne discerns its strength —out of the whole body of officers, places the ablest, most resolute steadiest and boldest at its head and in future wars, overcomes those nations who following the spirit of our time (ever less productive in truly warlike characters) neglect the cavalry."

St. J. F. M.

UNITED SERVICE INSTITUTION OF INDIA.

The Council propose to add the following to their Rules.

I. That Life Members be admitted on the following terms.

"Old Members" Rs. 45 + Current year's Subscription=Rs. 50

"New Members" Rs. 50 + Entrance Donation =Rs. 55

II. Every Gazetted Government Officer is entitled to become a Member on payment of the Entrance Fee and Annual Subscription.

Any Member dissenting from the above will oblige by communicating with the Honorary Secretary.

The Council give notice that a Gold Medal will be presented to the Contributor of the best Essay or Lecture published in the Institution Journal between 1st June 1878 and 31st May 1879.

NOTICE.— Back Numbers of the Journal can be obtained at Re. 1 per Copy on application to the Secretary.

By order of the Council,

A. D. ANDERSON, CAPT. R. A.,
Honorary Secretary.

SIMLA,
4th July 1878. }

NOTICE.

UNITED SERVICE INSTITUTION OF INDIA.

An Exhibition of Military Drawings, open to all Non-Commissioned Officers and Privates of Artillery, Cavalry and Infantry doing duty with their regiments in India, will be held at Simla, during September 1878.

All drawings intended for competition, to be with the Secretary by the 15th September.

FIRST PRIZE	...	...	70	RUPEES.
SECOND „	„	„	30	„

The drawings to consist of Military Sketches of Ground, executed in the manner taught at the Garrison Instruction Classes throughout India.

Drawings may be sent either framed or unframed.

By order of the Council,

A. D. ANDERSON, CAPT. R. A.,
Secretary United Service Institution of India.

SIMLA,
4th July 1878. }

N O T I C E.

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1878.

Members can pay their subscription to the Alliance Bank, Simla if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV, V and VI to any member wishing for the same.

A. D. ANDERSON, CAPT. R. A.,
Secretary.

ORIGINAL PAPERS.

I.

NARRATIVE OF THE JAWAKI CAMPAIGN

BY

CAPTAIN J. M. TROTTER,

Quarter Master General's Department.

21st June 1878.

TO THE SECRETARY

United Service Institution.

SIR,

The accompanying document may appear to the Council of sufficient interest to warrant its insertion in the Journal of the Institution, and if so the Quarter Master General has no objection to its being published.

Few of the members of the United Service Institution who have served for any time in Peshawur command have left it without being impressed by the military and political interests of the locality or without wishing to know more of the tribes and country immediately beyond the border hills. To this class of readers it will be unnecessary to apologise for the extent to which this report is devoted to topographical details and it is hoped that its prolixity in this respect will be excused by those who have not had the advantage of crossing the Indus, in consideration of such military lessons as cannot fail to be deduced from an account of the march of a considerable number of men through previously unknown country.

It will be seen from the first paras. of the report that the tribe whose territories formed the scene of our operations are known as the Adamkhey. These are said to number as many as 4,000 fighting men, an estimate which is probably considerably too high, and are a section of the Great Afridi tribe whose territories lie chiefly in the fertile valley of Tirah and in the Khaibar pass. In former times the Adamkhey like most of the other sections of the Afridis possessed extensive lands in Tirah to which a great portion of the tribe migrated yearly during the summer. Little, however, now remains to them of their possessions on the Western side of the Kohat Pass and the fact of their having been for many generations cut off from Tirah has led to an almost complete severance between them and the rest of the Afridis who hardly acknowledge them as cousins and have little connection social or political with them. To this and to the more enervating climates in which the lot of this section of the Afridis has been cast may be attributed the fact

that the Adamkheyel are rather despised as soldiers by their connections in Tirah, an opinion certainly well founded as regards the Ashukhely and Hasankhely divisions of the tribe though possibly less so in the case of the Galikhely and Jawakis. In physique they are as a rule inferior to the Malikdin kheyel, Kambhar kheyel and other Afridis of the upper valleys and their dialect from their connection with the people of the plains and the Khataks on their eastern frontier is somewhat less deep toned and gutteral than pure Afridi Pushtu.

A disquisition on the causes which led to the misdemeanours of the Jawakis would be "caviare to the general" and out of place in the Journal of the Institution, and sufficient has been said regarding the political aspect of the question in para. (3) of the report.

As regards more purely Military interests the expedition was in many respects unique, as the Afridi border had never been crossed since our troops were armed with Rifles or Artillery of modern pattern, and no deliberate occupations of any part of their country had ever been attempted. The number of men required for such an operation had naturally been constantly discussed and estimates could be quoted framed by many of the best authorities on mountain warfare and based on the powers of the old muzzle loading smooth bore arms, which contrast curiously with the experience derived from the late expeditions. The nature of the ground over which the Peshawur Columns advanced was peculiarly well suited for Artillery fire and it will be seen from the report that the trifling loss which invariably attended the advance and retirement of the Infantry is to be attributed at least as much to the accurate practice and judicious employment of this arm as to the long range of the Infantry Rifles. It will be observed that three different descriptions of Artillery were employed, and that each of them was found well adapted for the work allotted to it. The Heavy Battery in covering the first advance from the plains, and the passage of the Royal Horse Artillery guns on Elephants to the top of the first ridge where they in their turn became guns of position and covered the advance of the Infantry and Sappers during the destruction of Bori and the ascent of the higher hills towards the Fastaoni Valley, and lastly the Mountain Battery which accompanied the columns through the passes beyond Bori.

As regards Infantry Tactics as well as with reference to the equipment of the different arms there was much to be learnt during the expedition, and I hope that some members of the institution better qualified than myself for the task may be induced to favor us with papers on these subjects. I have already pointed out that such experience as we have gained tends to modify the views formerly held as to the composition and strength of the columns required for service in the border hills. On several occasions we had opportunities of observing the readiness displayed, by the enemy to take advantage of any mistakes made by our troops. Such mistakes are more likely to occur and are

certainly more difficult to remedy when the columns employed are numerically in excess of the requirements of the case.

The strength of a force must necessarily depend on the length of the lines of communication that have to be held but independently of this consideration it seems probable that two compact brigades of thoroughly disciplined infantry, armed with breech loading rifles and with a strong proportion of artillery will always be found at least as efficient for service against the Afridis as a whole Corps d'armée.

It will be seen from the paras. of the report which describe the operations of the surveyors attached to the force that as far as maps are concerned our ignorance of the country beyond the Bori range was singularly complete. The map accompanying the report has been reduced in the Quarter Master General's Office from copies of the 4=1 inch map supplied by the frontier survey a few days after the return of the troops to Cantonments. A more complete map including the Kohat pass* and the country between Shamshattee and Jalala Sar, will it is hoped be issued by the Survey Department in the next few months. A comparison of this with the existing sheet atlas will show the wide area of hill country added to our maps since last December.

It may fairly be hoped that the knowledge thus for the first time obtained of the country overlooking the Kohat pass and of the lines by which the latter can be turned will do much towards the peaceable settlement of the old "Kohat pass questions."†—If however the Galikheyl fail to appreciate or forget the lesson which has been taught them, the next force which has the good fortune to cross their border will be working in a country as well known as any portions of the British dominions.

I am

Sir,

Your obedient servant,

J. M. TROTTER, *Captain.*

* Vide concluding para. of the report.

† Vide para. of the report.

Extracts from the Diary of the Peshawur column of the Adam kheyl Field Force.

The force detailed in annexure A assembled at Fort Mackeson on 2nd and 3rd December. The number of baggage animals required for the light equipment of the regiments and battery ordered to cross the frontier, was completed by the arrival from Rawal Pindi of 500 mules on the latter date. These were distributed according to the scale given in annexure B.

2. The object of the expedition was, in the first place, to seize the ridge to the north of the Bori Valley, from which it was known that the whole of the villages in the latter would be under fire of our artillery, and which was therefore selected as a position to be strongly held as a base for such further operations in the Adam-Kheyl Afridi country as might appear desirable.

3. The Adam-Kheyl tribe consists of four principal sections—the Gali Kheyl, Ashu Kheyl, Hasan Kheyl, and Jawakis. The first three of these subdivisions had shewn no disposition to co-operate openly with the Jawakis in their hostility to the British Government, and it was held desirable, in considering the plan of the campaign, to avoid any measures which might appear to threaten their territory. With this view, nothing was demanded from the uncommitted sections beyond the use of the road leading through Kandao towards the top of the ridge which it was proposed to occupy. This was readily acceded to by the Ashu Kheyl, whose principal villages are at the foot of the hills forming the border of the Peshawar plain, and who are consequently, easily coerced in such matters.

4. The plain beyond Fort Mackeson is separated from the high hills occupied by the Jawaki and Gali-Kheyl (Torsapar) Afridis by two valleys, those of Bori and Uchalgada. These are bounded on their northern side (towards British territory) by a rocky range of hills visible from Peshawur, which, towards their eastern end, above the Hasan-Kheyl villages of Kui and Taruni, rise to a height of about 1,400 feet above the plain, and slope thence gradually down to their western extremity near the Ashu-Kheyl village of Kalan Kheyl. The villages of Kandar and Kandao, which are among the largest belonging to the Ashu Kheyl, are situated close to the Peshawar plain, at the northern foot of the ridge; the remaining villages of this section—Pakhi, Pridi, and Kalan Kheyl—being situated in the Uchalgada Valley.

5. The Bori Valley is about 400 feet higher than the plain on the Peshawur side of the hills, and is separated from that of Uchalgada by a low watershed near the point marked Piquet Hill in the sketch by Lieutenant Bartram, R. E. It is about two miles in length by about one in breadth, and, like the Uchalgada Valley, which is somewhat longer and generally narrower, is carefully cultivated in terraces, the numerous villages which it contains being owned exclusively by Jawakis.

A considerable brook, with an unfailing supply of water, runs through the eastern portion of the Uchalgada plain; but Pakhi and Pridi, nearer the head of the valley, are chiefly dependant on tanks. The Bori Valley is indifferently supplied with water, and has only two wells in the hamlets shewn as Etam Kheyl and Sher Kheyl in the sketch in which a limited supply is obtained from a depth of about 80 feet. Several of the other hamlets have shallow tanks, and a stream, tolerably plentiful in winter, but frequently almost, if not quite, dry in summer descends through the Spintang* Glen. There is also said to be a small spring behind the Etam-Kheyl hamlet.

The Spintang brook and the drainage of the valley generally runs round the eastern end of the ridge to the north of the valley, past the Hasan-Kheyl villages of Taruni and Kui, the former of which is situated at the mouth of a small steep valley separated by a narrow spur from the Jawaki territory, and the latter on more open ground at the Peshawur end of the narrow defile formed by the ridge above mentioned and the Janakhwar hills.

6. The plain between the Mackeson-Shamshattu road and the hills is generally cultivated, and is extremely heavy and difficult to pass over after heavy rain there are also several springs between Mackeson and Kandao which form considerable swamps. Several big nullahs cross this plain, the largest of which are known as the Uchalgada, Kandao, Tarakai, and Janakhwar ravines. These are all easily crossed near the hills, but, lower down, run in deep channels, with steep, slippery banks, where they are crossed by the frontier road. The Uchalgada nullah always has running-water in it, and there are springs at Kandao which run for some distance down the nullah named after the village, as well as at Imamzamana Ziarat, where the same nullah crosses the Shamshattu road. The Janakhwar ravine has very generally a small stream running through its upper portion, but is frequently dry where it crosses the road. There is also a spring generally running in the cold weather at the foot of the Sarghashi Pass; but this, like most of the streams from these hills, disappears in the sand at about one thousand yards from the base of the ridge.

7. The ridge between Kandar and Taruni is crossed by two passes—one at the village of Kandao, leading to the village of Pakhi, and the low watershed between the Uchalgada and Bori Valleys; and the other crossing the hill about one and a half miles east of Kandao, and known as the Sarghashi Pass.† There is a dip in the chain at Kandao, and the pass behind the village though a very rough one for mules, is short. At the Sarghashi Pass the hills are higher and steeper; but the old Afriti camel-track (now superseded by roads made by the force) ascends by fairly gentle gradients to within a few

* This brook is strongly impregnated with lime which covers the stones in its bed with a white chalky precipitate, whence its name Spin tang=white gorge.

† See note to para. 106.

hundred yards of the top, which is thence reached by a steep rocky zigzag. From the crest there is a similar road, in no part very steep, into the Bori Valley.

8. The Field Force before Mackeson was divided on December 1877 into two Brigades :—

The Right Brigade, under Colonel Doran, C.B., consisting of—

51st Regiment.

I-C, Royal Horse Artillery.

22nd Native Infantry.

27th

Two companies of Sappers and Miners.

And the Left Brigade, under Colonel Buchanan, 9th Regiment, composed of—

13-9 Royal Artillery, 40-prs.

9th Regiment.

200 men Rifle Brigade.

14th Sikhs.

20th Punjab Native Infantry.

The road across the nullahs towards the foot of the Sarighashi Pass, which had been selected, a few weeks before the troops moved, for the passage of the heavy guns, was shewn to the Officer Commanding 13-9 Royal Artillery by Lieutenant Heath. Some parts of it were very heavy from the recent rain, and that officer reported that he considered it doubtful whether his battery could get over it in the time allowed. His guns were therefore sent across the Uchalgada ravine (the first nullah on the road) on the evening of the 3rd, under escort of 14th Sikhs and two hundred men of Rifle Brigade; and, to obviate the possibility of the Brigade being left without artillery, two guns of I-C, Royal Horse Artillery, under Major Manderson, commanding the battery, were placed at Colonel Buchanan's disposal.

9. Detailed orders were issued to the Officers Commanding Brigades, and to the Departments concerned, explaining the nature of the operations to be undertaken on the following day. They were briefly as follows :—

10. The Right Brigade, under Colonel Doran, was directed to leave camp at dawn and march towards Kandao in the following order :—

27th Punjab Native Infantry.

Sappers and Miners two companies, and Infantry working-parties
51st Regiment.

I-C, Royal Horse Artillery (two guns).

Baggage of Left Brigade under strong baggage-guards.

22nd Punjab Native Infantry.

Baggage of Right Brigade.

200 men of 17th Bengal Cavalry.

The Left Brigade was ordered to follow Colonel Doran's troops and to turn off the road in front of Kandao by a track leading to the Sarghashi Pass, which was to be shewn them by Lieutenant Heath, Deputy Assistant QuarterMaster-General.

11. The Sarghashi Pass was reported by the Harkaras of the QuarterMaster-General's Department to have been blocked up with rocks in three places, and otherwise destroyed by the enemy, whose fires had been visible from Mackeson on several points commanding the road for some weeks past. This road, for the above reasons, and because of its being exposed to attack from the side of Janakhwar, was considered unsuitable for baggage, and it was determined to send the whole of the latter by Kandao.

12. The enemy were known to be in considerable numbers on the crest of the Sarghashi Pass, the Right Brigade was accordingly to ascend the hill above Kandao, and turn their position before the pass was attacked in front by the troops under Colonel Buchanan. The latter officer received instructions not to advance till he saw the skirmishers of the 27th on the hill above Kandao. He was then to make his way to the crest of the ridge, and, having dislodged the enemy, to move his Brigade along the top to meet his baggage and water, which were to join him *via* Kandao.

13. The Right Brigade, under Colonel Doran, was directed to return for the night to the plain before Kandao, after the sappers and miners had completed a mule-track; leaving the other Brigade in a position on the crest, to be shewn them by the Quarter-Master-General's Department. It was also arranged that the two horse-artillery guns on elephants with the Kandao column should join the remainder of the battery with the troops under Colonel Buchanan, and should be placed in position under that officer's orders, all the gun-elephants and baggage animals being sent back to Kandao for water. The baggage, greatcoats, and rations of the Right Brigade were left at Kandao, under the charge of the 17th Bengal Cavalry, and a small guard from each corps. Each British regiment was ordered to cook one day's rations to be carried in their havresacks next day; and the Native corps drew two day's rations from the Commissariat.

14. The attack on the pass was carried out on 4th exactly as arranged.

The 27th skirmishers, supported in their advance by the Royal Horse Artillery guns, were soon on the top of the Kandao hill; and the sappers and working-parties commenced operations on a track which had been selected by the Deputy Assistant Quarter-Master-General and Lieutenant Bartram, R. E., on the previous morning.

15. The turning movement of the Right Brigade rendered the crest of the pass untenable by the enemy. The latter were however,

turned out of their positions chiefly by the heavy and admirably directed shell-fire of 13-9 Royal Artillery, and retired, partly towards the Bori Valley, and partly to the hills on our left towards Kui and Taruni, from which they kept up a desultory fire at long ranges during the advance of Colonel Buchanan's column. The latter, shortly after reaching the top, surrounded their position with a breastwork of stones; the 14th Sikhs being on the right, the 9th Regiment and guns in the centre, and the 20th Punjab Native Infantry on the left. A few of the enemy kept up an ill-aimed fire on the troops while engaged in this operation, from a small ridge* in the Bori Valley immediately below their position. Two sepoys of the 14th and one of the 20th were wounded by this fire, and a man of the 9th Foot had the neck-button of his coat cut off by a bullet.

16. The head-quarters of the Brigadier-General during this day's operations were with the Right Brigade, to which Captain Brownrigg, Rifle Brigade, was attached as Deputy Assistant Quarter-Master-General. The Staff, with the exception of the Deputy Assistant Quarter-Master-General of the Force, and Lieutenant Heath, attached to the department who were with the Left Brigade, remained with the Brigadier-General.

17. It had been intended, as has been already described, that the troops under Colonel Doran should return, on the evening of the 3rd, to their rations and bedding, which had been left on the plain before Kandao. Information was however received from the Political Department that rendered it advisable to alter this arrangement, and they were ordered, late in the afternoon, to remain on the top of the ridge. Next morning, the commissariat arrangements being somewhat complicated by this change of programme, it was thought best to spend the day in improving the position taken up by Colonel Buchanan's Brigade, the more so that a fresh disposition of a portion of the force and of the commissariat dépôt was considered advisable.

18. The track from the village of Kandao made by the sappers was by no means a bad one; but the constant passage of camp-followers along it, to and from the water-supply, was thought likely to lead to complications with the inhabitants, who, the events of the last two months had shewn, were not to be depended on for the observance of neutrality.

19. The 51st Regiment and 22nd Native Infantry were accordingly ordered at 9 A. M. to return to Kandao, and to march thence by the road along the foot of the hills to the ground near the bottom of the Sarghashi Pass, on which the heavy battery and detachment of the Rifle Brigade had been left on the previous evening. The 22nd were ordered to bivouac at a short distance in advance of the battery and 51st Regiment, and were entrusted with the care of the water supply (the small stream noticed above), as well as the protection of all baggage and stores sent up the Sarghashi track, which now became the line of communication

* The low-watershed named piquet Hill, vide para. (5).

with the plains. The sappers and miners, with the assistance of infantry working-parties, soon removed the obstacles with which the enemy had obstructed the road, and made the latter a fair track for pakal mules and baggage.

20. Arrangements had been made by Colonel Buchanan for an early attack on the small ridge in the Bori Valley, the possession of which by the enemy had, as has been mentioned, caused some trouble on the previous evening ; and, as soon as the sanction of the Brigadier-General had been obtained, three companies of the 14th Sikhs and two companies of the 9th, under command of Captain McLean of the former regiment, assaulted the place. The ridge proved to be higher and more precipitous than it appeared from above ; but Captain McLean's party were soon at the top, with a loss of only two men wounded of the 14th Sikhs, and one camp-follower, a kahar, shot dead. A few of the enemy continued for some time to fire on the post established on this hill from the nullahs in the valley ; but they were dislodged by the marksmen of the 9th, who killed one of them and wounded two others.

21. It has been mentioned that a large portion of the enemy who had held the pass on the 3rd had retreated in the afternoon on to the end of the ridge towards Taruni. It was, of course, necessary to clear this hill before the pass road could be considered practicable for baggage and water-mules, and four companies of the 20th Punjab Native Infantry were detailed for this duty.

The enemy attempted to make a stand on the hill above Taruni, but they were soon driven off by the skirmishing companies of the 20th Punjab Native Infantry, who were reported by the officer commanding the regiment to have shot three of them during the first advance, and two subsequently on the slope of the hill towards Bori.

22. The Royal Artillery during the day ascertained with great accuracy the ranges of most of the hamlets of Bori, and of various points on several of the spurs over-hanging them ; and the knowledge thus gained proved, as will be shewn, of great value in the subsequent days operations.

23. On the 6th, 7th, and 8th December, the force was employed in destroying the towers of Bori.

24. The valley of Bori, as has been already described, is a broad strip of steeply-terraced wheat-fields, intersected by more than one deep nullah. The villages are situated at the southern side of the valley at the base of the precipitous bluffs ending the steep spurs from the Hasan-Kheyl, Jawaki, and Gali-Kheyl hills, or at the mouths of the gorges lying between these spurs.

25. Beginning from the left (east,) the first glen which opens into the valley is that of Taruni, described above. Next to this comes

the Wach-Bori* Valley—a long narrow valley, generally almost level at the bottom, or with a gentle gradient, and, like the Taruni Valley, cultivated in places. The hamlet of Etam Kheyl lies at the foot of the spur between the Taruni and Wach-Bori* Valleys. The next glen is the Bori-Chena† Pass—a deep and rugged defile which will be described hereafter in speaking of the advance to Pastaoni.

26. The village of Maghal Kheyl lies at the foot of the spur, known as the Dand ‡ Sar spur, separating the Bori-Chena Pass from the Spintang Valley, which has been already noticed as giving rise to a considerable brook, the only one which ordinarily runs in the Bori Valley. The Spintang is a picturesque glen well wooded with wild olives, and is chiefly important as a good pass for footmen into Torsapar. Another tract from the Spintang goes to the dip between the second cone on the Dand Sar spur and the main range above Pastaoni. This might be made useful in turning the Bori-Chena Pass. To the right of the Spintang are two more gorges—the first known as the Toto Kheyl Khwar,§ from the hamlet of that name, which is situated at its mouth ; and the second as Khair-ud-din Khwar, descending from the hill of the same name.

27. The face of the Torsapar range to the west of the Khaire-ud-din Khwar belongs to the Ashu Kheyl.

28. The operations in the Bori Valley have been fully described in the Brigadier-General's reports to Army Head-Quarters ; and, as the proceedings of each of the three days in the valley were singularly alike, a brief summary of them only need be given here.

29. On the 6th December the attack was directed against the hamlet of Toto Kheyl. The advance and retirement were covered by a heavy fire of shells from the Sarghashi ridge, the four guns firing in all 85 rounds per gun, at ranges of from 2,000 to 2,500 yards. The 20th Panjab Native Infantry, who crowned the bluffs immediately commanding the village, were nevertheless received with a sharp, though ill-aimed, fire of muskets and matchlocks as they approached the hills. The ground was, however, admirably adapted for skirmishing, and they quickly reached the foot of the spur, where the scarped rocks still further protected them from the enemy's fire. The 27th and 14th Sikhs held the hamlets while the towers were being blown up by the sappers and miners. An interesting description of these towers, and of their demolition, will be found in the report on the engineering operations of the force by Lieutenant Bartman, Commanding Royal Engineer. Our loss during the attack on this day was as follows :—

27th	...	...	1 kahar killed.
14th Sikhs	...	...	1 sepoy wounded.
			4 sepoys wounded.

* Wach—"dry."

† Chena—"spring".

‡ Dand means a "tank" and the Dand Sar peak is probably so called from a small tank, a few hundred feet above the village on the track leading to the top. It is also known as Chena-Sar.

§ Khwar—Watertcourse (generally a dry one.)

The small number of casualties on this occasion and during the next two days' fighting at Bori, was, in great part, due to the accurate shooting of the Royal Horse Artillery guns. The enemy on the first two days held the rocky hills behind the hamlets attacked, in large numbers but they were, within easy range of the guns on the ridge, and throughout the day, whenever a small group showed themselves, or made known their position by firing their muskets, a shell fell among or near them. Under these circumstances, they soon found that the ground they had depended on for defence was untenable, and their fire, even in the case of those who were armed with Enfields and other rifles, became hurried and unaimed.

30. On the 7th December the operations were of exactly the same character as on the previous day. There was some reason to believe that the enemy contemplated making a determined resistance, as information had been brought us to the effect that Malik Babri, the well-known Jawaki Chief on the Kohat side, was with the Boriwals.

31. The skirmishers, on reaching the base of the hill, were received with showers of stones and a somewhat heavy musketry-fire; but, as before, the enemy's position was at once rendered untenable by the shells thrown from the guns on the ridge; and the fire of the small number who held their ground during the advance, was easily kept down by a few marksmen with the supports, armed with the Martini-Henry. The enemy are reported to have lost heavily on this occasion, and two of them—a Bazoti and an Orakzai Mullah—were taken prisoners. A third volunteer from the neutral sections of the Adam Kheyl, a Gali Kheyl from Torsapar, was wounded by the 20th Panjab Native Infantry, and treated by the medical officer of the the regiment on the hillside. Our own loss was again small, consisting of—

9th Regiment	...	...	...	2 wounded.
14th Sikhs	..	..	..	2 "
20th Panjab Native Infantry	...	...	..	1 "

32. The Royal Horse Artillery guns on this occasion were moved at dawn along the ridge for three-quarters of a mile to a position to the east of the pass road, which had been selected for occupation by Colonel Doran's Brigade; and the latter, consisting of the 27th Panjab Native Infantry and detachments Rifle Brigade, 51st Regiment, and 22nd Native Infantry, marched to their new ground in the evening at the conclusion of their day's work in the valley. This arrangement was found desirable in order that stores and water, coming from the plain for the various corps, might be distributed right and left at the crest of the pass to the two Brigades, instead of all moving along one road. A change of ground for a portion of the force was also required on sanitary grounds, and to facilitate the collection of fuel.

33. On the 8th December the remaining towers of Bori were blown up, the enemy showing very little resistance. The spur dividing

the Bori-Chena Pass from the Spintang was held on this occasion by the 27th Panjab Native Infantry, who were opposed during their ascent by a small party of Jawakis, of whom they killed one and wounded another.

34. A reconnoitring party under the Deputy Assistant Quarter-Master-General, accompanied by Captain Brownrigg and Lieutenant Heath, made their way past the 27th Panjab Native Infantry to the base of the rocky peak marked Dand Sar in the map, in order to investigate a track, said by an Ashu Kheyl employed in the office to reach the crest of the hills near this spot, and thence, following the watershed south of Torsapar, to lead to Walai, a Jawaki village in the same valley as Pastaoni and about three miles above that place.

35. The destruction by the sappers on the 8th December of the remaining towers in the Etam-Kheyl hamlet, completed the work of the Peshawar Field Farce as regards the Bori Valley. The Jawakis had all taken refuge in the neighbouring villages of the "uncommitted sections," or had retreated through the Bori-Chena Pass ; and, in the absence of orders from the Panjab Government authorizing the General Officer in command to follow up his success by pursuing them into the Pastaoni-Walai Valley, further active operations were indefinitely postponed.

36. Our position on the crest of the Sarghashi ridge effectually prevented the enemy from re-occupying the Bori villages ; but, as similar measures of so-called blockade had proved wholly ineffectual in bringing the tribe to terms on the Kohat side, it was evident to most military observers that an advance on Pastaoni must eventually be undertaken. From the reconnaissance made on the 8th December it was ascertained that the Dand Sar peak was accessible for a mule battery, and we had been informed that, from its neighbourhood, view could be obtained, not only of the Kotal of the pass, but of much of the main range towards Torsapar, along which an enemy must advance to hold the Bori-Chena road. The collection of information regarding the Pastaoni Valley and its approaches from Bori, as well as the roads connecting it with Torsapar—a Gali-Kheyl valley known to be one of the chief places of refuge of the Jawaki families—became therefore a matter of great importance, and such information as was subsequently obtained regarding these places was from time to time forwarded demographically to the Quarter-Master-General at Army Head-Quarters.

37. The weather since the troops left Mackeson had been extremely favorable for bivouacking ; but at 4 P. M. on the 8th December, before the troops regained the Sarghashi ridge, rain began to fall heavily, and continued throughout the night, accompanied by high wind. The heavy battery and the head-quarters of the 51st were fortunately under canvas in the lower camp, and all available elephants were despatched to Fort Mackeson to bring as much as possible of the camp-equipage of the remaining corps left on the ridge. The latter

were without protection of any sort during the night of the 8th, but did not suffer materially, either in health or spirits, from the exposure they were subjected to. Next morning the troops on the ridge, with the exception of a detachment under Lieutenant-Colonel Rogers, 20th Panjab Native Infantry, consisting of half-battery I-C, Royal Horse Artillery, and two companies each of 9th, 20th, and 14th Sikhs, were withdrawn to the lower camp. The 9th, having no dry clothes or bedding, marched to Mackeson, which they reached with great difficulty, crossing the nullahs with the assistance of some commissariat and battery elephants. The Native regiments remained at the foot of the pass, where a portion of them were under canvas. Five bell tents were also, with some difficulty, sent on to the ridge for the use of the men of the 9th and of I-C, Royal Horse Artillery ; but a portion of these had to be used for hospital purposes, and the greater part of the men continued exposed to the rain, which, varied with sleet, fell heavily throughout the day and night of the 9th.

38. The head-quarters of the Brigadier-General were moved on the morning of the 9th to the lower camp, where Captain Brownrigg had been sent to represent the Department. The Deputy Assistant Quarter-Master-General and Lieutenant Heath, attached to the Department, remained with Colonel Rogers' party on the ridge.

39. The excellent conduct and powers of endurance of the British and Native troops under these trying circumstances has been already noticed in the Brigadier-General's report, and any further mention of it here would be out of place. It may, however, be worthy of record that the effect on the health of the men, of this prolonged exposure to rough weather, was very slight, with the exception of those who had suffered from fever during the autumn, many of whom were admitted to hospital during the next few days with a more or less severe return of the same disorder. The kahars and other Hindustani camp-followers suffered, as might be expected, more severely ; six of them being found dead on the morning of the 10th, and a very large proportion of the others becoming completely unserviceable from the intense cold and the want of suitable clothing.

40. A Field Force Order was published on the 11th, authorizing the Commissariat to distribute to the various classes of camp-followers, a number of Peshawari posteens which had been in stock for some years past, adjusting the cost from their pay hereafter. There can be no doubt that this measure added greatly to the efficiency of the camp-followers during the rest of the campaign.

41. The Army Signalling Department has not been mentioned in the above account of the destruction of Bori. It will be seen from General Ross's report that the success of this branch during the whole of the operations of the Peshawar Field Force was complete to an extent I believe, altogether unprecedented in any former expedition. The whole of the arrangements of the Signalling Department were, with the

Brigadier-General's approval, confided to Captain Wynne of the 51st Regiment ; and as that officer was in no way indebted to this Department for superintendence or assistance beyond general orders regarding the nature of the work to be done each day, and such topographical information as he required, his reports are forwarded in original. These will be found very interesting, and form a valuable record of the use that can be made of army signalling when efficiently organized.

42. The operations of the two companies of sappers and miners under Lieutenant Bartram are described in separate reports from that officer, which have been attached to the Brigadier-General's despatches. It will be seen from these that their work, while the force was engaged before Bori, consisted chiefly in blowing up towers ; and, as these demolitions were in every case completely successful, the reports on the procedure adopted form a useful record for future guidance.

Between the destruction of Bori and the advance on Pastaoni, the sappers and miners were employed without intermission in the construction of roads, and the improvement of the communications generally, between the ridge and the lower Sarghashi camp, as well as between the latter and Peshawar, in which works they were assisted by working-parties detailed daily from each corps in the force.

As regards roads, the chief works undertaken by them were, in the first place, the reconstruction of the old Afridi road from the lower camp to the crest, and thence down into the Bori Valley, which was made into an excellent baggage-road eight feet wide throughout. An alternative baggage-road was also made from the lower camp to the crest of the ridge : this was so far a better military road than the old one, that it followed as far as possible in its ascent the crest-line of a spur, without crossing any nullah of importance ; whereas the Afridi road, as is generally the case in these hills, took advantage of the beds of several water-courses, and was liable to be destroyed by floods or obstructed by the enemy. The new road was a work of great labour, but was of much use to the force, and, being practically indestructible, may, at some future date, be again of value if further expeditions are undertaken into the Adam-Kheyel country.

43. The same may be said of a road constructed from the crest of the pass to the point on the ridge above Taruni, which, as will be mentioned hereafter, was selected as a position for the Royal Horse Artillery guns used to cover the advance of the force through the Bori-Chena Pass. Another important road was opened out in rear of the camp, across the nullahs from the Sarghashi camp to Aza Kheyel, whence a good baggage and artillery track was found across the Maira* to Budde-bhair. This was some five miles shorter than the old road *vid* Mackeson and far superior to the latter, especially in wet weather.

* *Maira* signified 'desert,' the name is applied to several unirrigated tracts in the Peshawar Valley generally sprinkled with kunkur or stones—*Maira* land is always good ground for road making.

44. The necessity for obtaining an accurate survey of the Bori Valley and its approaches, and of any other new ground which might be visited by our troops, had been strongly urged in the instructions, received before leaving Peshawar, from the Head Quarters office. As regards the hills actually forming our border, there were inaccuracies, and an entire want of the detail required for military purposes, in the existing maps; and the greater part of the Adam-Kheyl country between the Bori and Uchalgada hills and the Kohat Valley had never been seen by Europeans, and was very imperfectly known to us from Native reports.

45. The prolonged occupation of Bori, and the subsequent advance of the Peshawar troops through the Afridi country to Pastaoni, and eventually to Kohat, afforded exceptionally favorable opportunities for accurate survey operations, and have resulted in the production of a map, on a scale of $4''=1$ mile, of the whole of this important tract of country. The area thus added to the map on the above scale by Mr. Scott, of the Frontier Revenue Survey, amounts to 150 square miles of hitherto unknown hill-country. This has been connected with the survey, partly on a scale of 2", and partly 4", to the mile, by Mr. Gibson, attached to the Kohat force—making a total of 250 square miles. Mr. Scott joined the Peshawar Force on the 18th December, and was for some days employed in the accurate measurement of a base line in the plain to the rear of the lower Sarghashi camp, and in fixing with the theodolite three principal stations on the Sarghashi ridge. These were visited by him on the 21st to 24th December; and from them were fixed the relative positions of numerous peaks and other prominent points in the ranges beyond Bori, which became the basis of the plane-table work, the progress of which is described in the succeeding sections of this report. The base line, and the stations on the Saghashi ridge, were also connected with a Revenue Survey station of 1869-70 on the Tarakai ridge—a low line of rocky hills about two miles south of the Sarghashi camp.

46. Previous to the arrival of Mr. Scott, arrangements had been made by the Deputy Assistant Quarter-Master-General for a correct military survey of the country to be visited by the force, which resulted in the theodolite and chain-survey of the Sarghashi ridge by Lieutenant Wright, R. E., described in that officer's letter, dated 16th December 1877, annexure E; and in prismatic-compass sketches by Lieutenant Dun, attached to the Department, and other officers, of the positions at Sarghashi, Pastaoni, and elsewhere, as well as an extensive series of landscape sketches of different parts of the Adam-Kheyl country, chiefly by Lieutenant Bartram, R. E., and Lieutenant Dun—all of which have been submitted to the Head-Quarters office.

47. Before concluding this notice of the survey operations, and resuming the narrative of the further movements of the Field Force, it seems not out of place to notice the valuable assistance in reconnaissance-work afforded to the Quarter-Master-General's Department by Mr. Scott. This gentleman's exceptional knowledge of hill-country, and

the untiring energy which resulted in his constantly being found with the skirmishers, rendered his opinion on the lines by which various points should be approached by our columns, of great service on many occasions.

48. On the night of the 23rd December, orders were issued by the Brigadier-General for a reconnaissance of the crest of the hills overlooking the Pastaoni Valley. A considerable amount of fresh information had been obtained in the course of the 22nd and 23rd, regarding the approaches to Pastaoni, from Hasan-Kheyl and Kandaowal (Ashu-Kheyl) scouts in the pay of the Department, who had carried several letters from General Ross to General Keyes across the hills while the force was engaged before Bori. On the latter date, the Deputy Assistant Quarter-Master-General, accompanied by these men, Captain Delatour of the Hazara Mountain Battery, and Colonel Rogers, 20th Punjab Infantry, had taken a party of the 20th Punjab Infantry under Subadar Mauladad to the extreme end of the ridge overlooking Taruni, and had ascertained that the Kotal of the pass leading to Pastaoni, which was then seen for the first time, was distinctly visible from a point at the end of the ridge, which afforded an excellent position for Royal Horse Artillery guns, and also commanded a view of the lower Sarghashi camp. This point was selected as a position for the battery to cover the advance, and was subsequently shewn to Captain Wynne, Superintendent of Signalling, as a permanent heliograph station for the maintenance of communications between Pastaoni and Peshawur.

49. Regarding the pass, we had reason to believe that the road was used by camels with light loads of salt and wood ; but we could not ascertain that it was considered practicable for mules or laden bullocks. As to the Dand Sar spur, it was reported that the track already investigated was used, as far as the base of the rocky cone shewn in Lieutenant Bartram's sketches (the limits of the reconnaissance of the 8th), by cattle driven up to graze and collect grass, and that, beyond it there was a track practicable for footmen only, which led to the main range, and thence down to Walai.

50. Mr. Scott had plotted, at the request of the Department, the whole of his survey as regards this portion of the hills, and warned us that the information given by our Native informants was correct, that there was a second conical hill between the Dand Sar peak and the main range, and that their account of the formidable dips in the spur between these cones and the main range was probably also well founded. This gave some weight to the recommendation of a well-informed man among our Ashu Kheyals that we should advance up the Spintang Glen. The latter is, however, a deep-wooded gorge, both sides of which would have to be held, and it was also known to be the chief road for footmen from Bori to the Fali-Kheyl (Torsapar) territory; and, as the Punjab Government were understood to be desirous to maintain the professed neutrality of that section of the Adam Kheyl, the original proposal of the Department to confine the advance to the Dand Sar spur, was preferred by the Brigadier-General.

51. The orders issued on the 24th for the guidance of the officers selected to command the reconnaissance, and the detail of the troops employed, will be found in annexure F.

52. Colonel Buchanan was subsequently instructed not to attack the village of Pastaoni, nor to proceed further than the crest of the ridge unless he was attacked in force. In this case he was directed to advance on the village if he found that he had time to do so, and, in any case, to drive the enemy off before he began his retirement.

53. The villages of Bori were found deserted on the morning of the 25th, and the ascent of the Dand Sar was commenced shortly after daylight. The precipitous bluffs at the base of the spur proved, as had been anticipated, a formidable obstacle for the mule battery, but the track beyond this to near the top was fairly easy. Thence, the only line that could be followed to the summit of the first peak led over large blocks of stratified limestone, which again severely tried the climbing powers of the battery. From the top of the peak a view was obtained of a portion of the Pastaoni Valley and of the Kotal of the Bori-Chena Pass. This Kotal proved to be a spur from the Torsapar hills, or, more correctly, a low saddle in the main range, and formed, with the Dand Sar spur, a precipitous amphitheatre of hills round the head of the pass.

54. The Dand Sar peaks were found to be connected by a narrow rocky saddle extremely precipitous towards the Spintang, but in places less so towards the pass, to which a narrow rocky path descended, which was made use of in withdrawing the mule battery. The second peak is within easy rifle-range of the first, and the former is similarly only a few hundred yards as the crow flies from the crest of the main range; so that, even if held by a determined enemy, the advance of the leading parties of a force moving by this line could always be covered by the fire of the supports. Between the second peak and the main range there is a break in the limestone, which exposes the underlying strata of marl or clay, and the latter have been worn away to a depth of several hundred feet by the water draining on the one side into the Spintang, and on the other into the Bori-Chena Pass. The chasm thus formed was found very difficult to cross, and the men of the 20th Panjab Infantry, who formed the advance guard, had to pass down in single file, handing their rifles from one to another at the worst places.

55. The 14th Sikhs were left on the Dand Sar with the Hazara Mountain Battery, orders being given to the officer in command to send the latter down into the pass as soon as the advanced party began to descend from the Kotal, and to hold the Dand Sar spur until every one was clear of the pass.

56. The ascent of the ridge above Pastaoni was again steep and difficult, the main range here consisting of limestone stratified in huge blocks tilted up vertically, being generally extremely precipitous both

to south and north, and affording no practicable tracks except along the actual watershed.

57. From the crest of the ridge the whole of the Pastaoni country was visible, with the village of that name built on and behind a small rocky hill in the middle of the valley, and also the Hasan-Kheyl villages of Spargai and Garai. No water could be seen in the valley except beyond Garai, about two miles below Pastaoni towards the Khwara.

58. The gorge on the opposite side of the valley in which the spring known to supply Pastaoni is situated, was pointed out by our guides, and one of them affirmed that there was a well in the village which, although its existence had never before been heard of, and was stoutly denied by his companions, proved, as will be seen, a very valuable one.

59. The advanced party halted for an hour on the ridge while the plane-table survey was being completed, and thence made their way to the Kotal, from which the road to Pastaoni was seen to lead through the village of Spargai at the foot of the hill, after descending the latter with a moderate gradient.

60. Towards Bori the descent is somewhat steep for the first two miles, the road generally following the base of the hill to the right, and being completely commanded in all directions. Beyond this, the gradient to the mouth of the pass is slight, but the precipitous hills on the right and left close in upon the road, rising in places like walls of rock on both sides. The road is throughout rough and bad, and in many places so narrow as to be with difficulty practicable for loaded mules. At one point, about two miles from the mouth of the pass, a remarkably fine spring suddenly bursts out of the rock, and runs for a mile down the middle of the road. This stream occasionally comes down for some hours in heavy flood after long-continued rain, and entirely closes the pass, and even in dry weather is a serious obstacle to mule traffic, as in many places the only practicable track is over the wet rocks forming its bed.

61. The second column, under Colonel Doran, had, during the day furnished a crowning-party on the heights to the right (east) of the pass. These are easily accessible by a steep path which leaves the Wach-Bori Valley about half a mile above the Maghal-Kheyl hamlet, and, though extremely precipitous towards the pass, afford a good track along their sky-line, which, unlike that of the Dand Sar, runs closely parallel to the line of the pass road below.

62. The distance from Bori to the Kotal is thus much shorter by the hills to the east of the pass than by the Dand Sar spur; but the latter affords many more positions from which the roadway through the pass can be commanded; and on this account, as well as from the

long circuit of hills that have to be held, requires much larger crowning-parties than the former.

It was at first arranged that the sappers and miners with Colonel Doran's Brigade should be employed during the day in improving the roadway through the pass, with a view to the possibility of an advance on Pastaoni being eventually determined on. This was, however, countermanded, and the greater part of the 1st Brigade, including the sappers and miners, was taken by the Brigadier-General a short distance up the Spintang Valley, where they destroyed a tower from which a few shots had been fired at our troops, and which there had not been time to blow up during the demolition of Bori.

63. The Afridis appear to have been quite unprepared* for this reconnaissance, but our meeting with no opposition was also, in part, due to the fact that the men ordinarily on the look-out in the pass had gone to Torsapar to attend a Jirga of their own tribe and the Gali Kheyls.

64. As the column re-crossed the Bori Valley, several detachments of the enemy shewed on the hills above the Spintang from the direction of Torsapar; but were prevented by a few shots from the Royal Horse Artillery guns on the ridge from pressing the retreat.

65. The troops got back to the lower camp shortly after dark having performed more than twelve hours' hard work without a single straggler.

66. One of the enemy, who was ascertained to be a Boriwal of distinction, was killed in the Spintang.

67. The information gained by the reconnaissance above described was of great military value. There had for many years past been no two opinions among well-informed persons regarding the strategic value of the Pastaoni country to a force operating against the Adam Kheyls, and it was known that this valley was considered by the Jawakis, and indeed by all sections of the tribe, as only second to Torsapar as a place of refuge against external enemies.

68. Regarding Torsapar, a portion of the Gali-Kheyl country, now as well known as the rest of the hills between Peshawar and Kohat, singularly little information was available; but it was known that Pastaoni could be approached by two roads—one the Bori-Chena Pass, which was believed by many good authorities to present insurmountable difficulties to the advance of troops accompanied by baggage and stores; and the other a road *vid* the Khatak Khwara† and Musadara.

* NOTE.—This was so much the case that a notorious Hasan-Kheyl robber was caught by the troops asleep near the spring in the pass, with five camels stolen the day before from Spin-Khak.

† The Khatak Khwara is the valley and tributary ravines, running towards the Indus, at the back of the Cherat range. It commences at Totkai the frontier post near the last Afridi village of Musadara. The upper part of the same valley from the Sandalai Kotal, (*vide* para 23) is known as the Afridi Khwara.

69. There were many reasons in favor of an advance by this line, one of the most cogent being, that the reports on Pastaoni in the Quarter-Master-Generals's office spoke of it as ill-supplied with water, and depending on one small spring, and that it was known that the march from the Khwara *vid* Musadara would be through a well-watered, country to within a few miles of Pastaoni. The road in question to near Musadara, a Hasan-Kheyl village, was within our frontier, and, beyond this, a low and very open pass was reported to lead into the Jawaki territory. On the other hand, an advance *vid* Musadara would have entailed a change of base to the Khwara, involving a delay of some weeks; and it was also urged that, as Pastaoni was known to be a place resorted to by the tribe with their families and cattle when pressed by their enemies, it could not be so badly supplied with water as was supposed.

70. The Bori-Chena Pass had, of course, the further advantage of being shorter and more direct than the alternative route; but it was considered undesirable to attempt to force it until its capabilities as a baggage-road had been more fully investigated.

71. The Brigadier-General had been informed, in a demi-official letter, dated 20th December 1877, from the Military Secretary, Panjab Government, that the Lieutenant-Governor hoped that he would be able to arrange with General Keyes for an advance into the Pastaoni Valley; and had had an opportunity of communicating his views on the subject to His Honor on the 21st, during a visit paid by the latter to the Sarghashi camp and ridge.

72. The only obstacle to an advance from the Peshawar side was as we have seen, the supposed difficulty of taking mules through the Bori-Chena Pass, and this the reconnaissance of Christmas Day proved to be imaginary, or at least to have been greatly exaggerated.

73. Arrangements were accordingly made, with the consent of His Excellency the Commander-in-Chief, for the occupation of Pastaoni by the Peshawar column on as early a date as possible after the cessation of the rain, which fell without intermission during the first days of Christmas week. The 31st of December was eventually fixed for the advance, and it was understood that General Keyes' column from the Kohat side would arrive in the Pastaoni Valley on the same day, coming from the direction of Walai, towards which village General Ross was requested to push forward his skirmishers, in the event of his reaching Pastaoni before the Frontier troops.

74. Four days' rations were taken by the Peshawar column, of which two days' supply was carried by the regiments, and the remainder by the Commissariat; the equipment of the column, and scale of distribution of carriage, being much the same as on the first advance on Bori, as will be seen by annexures C and H.

75. The orders issued by the Brigadier-General (as far as this Department is concerned) on the 30th December, for the march of the column through the Bori-Chena Pass on the following day, as well as the composition of the columns, will be found in annexure F and G.

The share performed by each regiment in the hard day's work of the 31st December has been fully detailed in the Brigadier-General's despatch, and need not be repeated here. The march, as will be seen from the same document, proved a more severe one for the baggage animals than had been anticipated. This was in part due to avoidable causes.

It had at first been intended that the whole column should pass the night of the 30th in the Bori Valley, but most of the houses best situated for quartering the troops had unfortunately been burnt, and both Commanding and Medical Officers were strongly opposed to any plan involving the exposure of their men to the damp mist which filled the valley after the late heavy rain. The column had therefore to start from the lower Sarghashi camp, which added several hours to the march.

76. The sappers had made an excellent causeway by the time the baggage animals arrived at the point in the pass where the spring mentioned above obstructed the passage of the mules; but the original orders issued by the Commanding Royal Engineer for parties of them to accompany the advance-guard to various places, which he had noticed on Christmas Day as likely to prove troublesome, had by some misconception been countermanded.

77. The cause, however, which, more than any other, delayed the passage of the baggage through the pass, was the insufficient strength of the baggage-guards. The number of men detailed for this duty in Brigade orders was unusually large; but at many points the road was so narrow that load after load was knocked off, and it was seen that every man who was not actually required to crown the heights ought to have been added to the parties in charge of the mules.

78. These matters, of course, received due attention on the return of the force from Pastaoni, as well as on the occasion of the final advance of the Peshawar column towards the Naru Khula; but it may be of use to record them here for the guidance of the next force that crosses the Afridi frontier.

79. The mules provided by the Commissariat were, on the whole, good, though a considerable number of them were too young for the load (two maunds) which they were supposed to be able to carry. Many of the loads were found very inconvenient, among the worst being the khajawas provided by the Commissariat for the carriage of loaves. These from their shape, struck against the rocks at narrow places on the road, and caused constant blocks in the line of baggage. A certain amount of water had to be carried in pakals for the detachment it was proposed

to leave on the ridge above Pastaoni. This is an objectionable mode of carrying water on roads like that through the Bori Chena Pass. The pakal mules were constantly upset by their loads striking the rocks on either side of the track, and not only were several men required on each occasion to re-load the pakals, but the latter were in some instances injured by falling. This cause of delay might be avoided by carrying water in kegs instead of pakals.

80. The Deputy Assistant Quarter-Master-General was on this occasion directed to report on the possibility of taking mule guns over the hills on the left of the pass, and was accompanied by two selected non-commissioned officers from the Hazara Mountain Battery. The distance by this line was found to be very much shorter than by the Dand Sar spur, and the road generally much easier; but in two or three places no track could be discovered over which mountain-guns could be taken, unless accompanied by strong working-parties; and, on the whole, the heights on the left were found to present fewer commanding positions for artillery than those on the opposite side of the pass.

81. The path from the Kotal was a fairly good one, though in places narrowed by projecting rocks to an extent which made it extremely difficult for loaded mules, though possibly better suited for the hill camels, which, as already mentioned, are known to struggle over it in considerable numbers at certain seasons.

82. The village of Pastaoni consists of four principal hamlets, with two towers concealed from the foot of the pass by the village of Spargai, and by a low rocky hill which rises steeply in the middle of the valley. It is situated, as will be seen from the map, at the junction of two valleys*—the first, a small one, lying close under the ridge forming the Kotal, and cultivated by the Hasan Kheyls of Spargai; and the other, a more considerable one running down from Walai and separated from the former by a longer flat-topped spur from the Torsapar hills that, further up, forms one side of the Gulo-Tangi Glen, which will be described hereafter. For about a mile above Pastaoni the valley is cultivated, but beyond this, towards Walai, it becomes narrower, and is densely wooded with kao trees (wild-olive). The whole valley west of Pastaoni belongs to the Jawakis, as does the cultivation immediately surrounding the village. At about half a mile below this, however, the cultivation belongs to the Hasan Kheyl of Garai, a village shown in the map; and the whole of the wide cultivated valley stretching beyond this towards Musadara as far as the British (Khatak) frontier at Tutkai, belongs to the latter section.

83. A party consisting of five companies of infantry under Lieutenant-Colonel Gordon, 20th Panjab Native Infantry, was left on the

* NOTE.—The height of the valley at Pastaoni as nearly as could be ascertained with a pocket barometer is about the same as that of the highest part of the Sarghashi ridge, (vide para. 4.)

Kotal with orders to hold a position on the right and left of the road during the stay of the force in the valley. The 27th, with a portion of the 9th and 20th Regiments, which were the first corps to reach the top of the pass, began to move down the hill about noon, and the village was carried by the skirmishers of the 9th and 27th, as explained in the General's report. The enemy, who were not more than thirty or forty in number, received the skirmishers with a volley—a mode of firing for which they had on several previous occasions shown a predilection ; but, as usual, displayed but little knowledge of the use of the rifles with which many of them were armed, as a large proportion of their shots passed far over our heads. The hill at the point where the skirmishers reached it proved extremely steep, and, by the time the latter had reached the top, the enemy had left the village, crossed the valley beyond, and disappeared into the jungle on the opposite ridge, on the top of which a piquet of the 27th was left for the night. The Brigadier-General then pushed on, with a portion of the 9th and of the 20th, towards Walai, and met General Keyes at a short distance from that village.

84. A heliograph party had meanwhile been established on the Kotal, and before the force had been an hour in the valley, it was placed in communication with Peshawar through the station above Taruni and the field-telegraph office at Mackeson.

85. The water-supply of Pastaoni had, as has been mentioned, been for a long time a subject of enquiry with reference to the possibility of occupying the Adam-Kheyl country ; and, as the springs which supply the valley are in their peculiarities typical of the character of the most of the streams in the Kohat and Peshawar hills, it may be well to describe them here.

86. The chief source from which the village is supplied is a spring in a deep and rocky ravine in the precipitous range behind the hill, on which, as mentioned above, the piquet of the 27th had been posted. The water runs for a very short distance in this ravine, and disappears where it leaves the hills ; its course underground being marked on the surface by a dry stony water-course, which carries the drainage of the hills in very wet weather past the village and down the centre of the valley. In this watercourse, close to the hamlet shewn in Lieutenant Dun's sketch as occupied by the Rifle Brigade and General's headquarters, a well seventy or eighty feet in depth has been sunk, which appears to strike the same spring, as it produces an inexhaustible supply of fine cold water at all seasons.

87. At Walai, in the same way there is a fine stream of water formed by the junction of a brook rising in the Walai Valley and another coming from the Gulo Tangi. This runs to within a mile of Pastaoni, and is then lost to sight in a stony river-bed for a least three miles, where it again comes to the surface, reinforced by the water of the Pastaoni spring, and possibly by others, and flows in a considerable stream past Musadara into the Khwara.

88. Small parties of the enemy appeared in the afternoon and fired occasional long shots at different portions of the force; and a party of the 20th under Colonel Rogers, who had escorted General Keyes back towards his piquets on the Dargai Sar, were fired on by rather a large party as they returned towards camp. They were, however, discouraged from coming to close quarters by the mountain battery, which lost no opportunity of dropping a shell among any group of them which came within range on the hillside, and no casualties occurred among our troops. A portion of the baggage was still on the northern side of the Kotal when the sun went down, and was collected by the officer commanding the post on a small plateau a few hundred feet below the crest. The night was an exceptionally cold one, with a bitter north wind, and frost sufficiently hard to form nearly two inches of ice on the tanks in the valley; and the officers and men in position on the Kotal and in charge of the baggage had no food, except what was in their havresacks, and very many of them had neither greatcoats nor blankets. The safety of the baggage is no doubt to be attributed to the strong position occupied throughout the night by this portion of the force on the Kotal, and on the crags surrounding the plateau above described.

89. The position at Pastaoni was a very satisfactory one, as may be seen from Lieutenant Dun's sketch; and the night passed quietly. The fact of its being brilliant moonlight was, no doubt, in our favor; but we learnt also from our native informants that the mass of the fighting-men of the tribe were either taking refuge in Torsapar, and in Hasan-Kheyl and Ashu-Kheyl villages nearer Bori, or were watching the Naru Khula and Gulo Tangi, where a considerable number of their families and cattle were living in temporary grass huts, and which they had reason to believe were threatened by the Kohat troops.

90. On the morning of the 1st January 1878, General Keyes' columns were withdrawn from the Dargai Sar range, and re-occupied their former positions on the Kohat side of the hills. The day was spent by the Peshawar force in completing the survey of the neighbourhood, and in making reconnaissances towards Garai and other villages. The sappers were also employed all day in improving the road on either side of the Kotal; the work found necessary being merely the removal of occasional rocks which narrowed the roadway, and had upset or disturbed the loads of nearly all the smaller mules in succession as they passed.

91. The two towers, which were the chief feature in the village, and were both remarkably fine specimens of Afridi masoury, were also prepared for demolition under the orders of the Commanding Royal Engineer.

92. The enemy gave very little trouble during the day, though a few of them approached the piquet to the south-west of the camp, from which they were driven off with the loss of one killed and one wounded, who was taken prisoner.

93. As far as their intentions could be ascertained, there is reason to believe that the war-party among the Afridis was now in a decided minority, and that they were encouraged by the retirement of the Kohat force to hope that the Peshawar column would be similarly withdrawn, and that peace would be concluded without a further investigation by our troops and survey-parties, of the interior of their country, of the weakness of which, after the first outworks had been penetrated they must by this time have been fully aware.

94. On the evening of the 1st January all preparations were made for the return of the force at daybreak next morning to the Sarghashi ridge and camp ; and a portion of the Right Brigade was sent to the plateau below the Kotal, with all baggage and stores not actually required by the troops in the village.

95. The baggage guards, under the orders of Captain Ba^x; were strongly reinforced ; and Lieutenant Dun, attached to the Department, in the topographical branch, was appointed assistant baggage-master as a temporary arrangement.

96. An advance-guard of Native Infantry, under a selected officer, left camp at dawn (on the 2nd), and was followed by the baggage as soon as it was ascertained that the road was clear. The heights on either side of the pass were crowned by the same troops as before, an additional company of the 27th being detailed for the protection of the right ; and the portion of the force thus employed, which was under the orders of Colonel Buchanan, was directed to remain in their positions until the advanced Brigade under Colonel Doran, c. B., signalled from the Bori Valley that the whole of the baggage had left the pass.

97. The baggage passed through on this occasion without a check, and the retirement on both sides was commenced simultaneously at about 11 A.M., on receipt of a preconcerted signal of eight shots fired in rapid succession by Colonel Buchanan's orders. A few Afridis attempted to creep up the hill from the Spargai Valley, but were driven back by the marksmen of the 9th and 20th ; and a few shells from the Hazara Mountain Battery similarly checked the advance of a party which collected near the crest of the Spintang.

98. The whole of the troops regained the Bori Valley early in the afternoon, and reached the Sarghashi camp without any casualties.

99. On the 4th January a reconnaissance was made of the Wach-Bori Valley, the situation of which has been described in the earlier portion of this report, and in which some of the Boriwals were reported to have formed a dépôt of their corn and moveable property. The column was commanded by Colonel Doran, c. B., and consisted of the 20th, 27th and Hazara Mountain Battery, with signalling parties from the 9th Foot and other corps. Parties from the 20th and 27th were

detached to the heights to the right and left, the Deputy Assistant Quarter-Master-General accompanying the latter with a view to seeing as much as possible of the village of Taruni. The Wach-Bori Valley was found to be a long narrow defile running back into the hills for nearly three miles, generally almost level at the bottom, and cultivated in terraces in places. No water was found or traces of habitations, with the exception of a few empty grass huts. A considerable amount of corn was found near one of the latter, and handed over to the Commissariat.

100. The hill between Wach-Bori and Taruni is a long, hogbacked ridge, fairly level along the top, but generally precipitous towards Taruni. The arrival of the skirmishers on the crest overlooking the latter was the signal for a general stampede from the village; large numbers of women, said to be the families of the Boriwals, leaving the houses and driving large flocks of cattle and goats up the Taruni Valley. The latter much resembles that of Wach-Bori, but contains one of the largest hamlets of the village, with a fine tank and several towers. The remaining houses and towers are situated in the Kui Taruni Pass, on either side of the stream formed by the Spintang brook joined by the rest of the drainage of the Bori Valley.

101. No official intimation was received by the Brigadier-General that further operations were contemplated against the Jawakis, but there were many reasons for believing that the end of the difficulty had not yet been arrived at. In the first place, it was asserted that the Jirga of the tribe was deterred from waiting on the Commissioner by exaggerated reports, given by persons interested in the prolongation of hostilities, regarding the nature of the terms which were to be exacted from them. It was also said, probably not without reason, that the retirement of the troops from the Dargai Sar and from Pastaoni had been considered by the Jawakis as evidence of our inability or unwillingness to proceed further; and that they hoped, by utilising what little shelter was left them for their families in the unvisited portion of their territory, or was afforded them by the Gali Kheyls and others, that they might hold out for some months longer, and that the British Government might be induced to offer them more favorable terms to avoid the expense and trouble of keeping troops in the field.

102. Advantage was taken of the cessation of active hostilities, and the few fine days available in the first two weeks of January, to employ the troops in making such reconnaissances as were required to complete our knowledge of the country, as far as it was accessible from camp, and to afford opportunities to Mr. Scott for filling-in and adding to the map on which he was engaged,

103. The reconnaissance of the Wach-Bori Valley and of Taruni has already been described. Subsequently to this, Mr. Scott was able to add to the map, the country immediately in front of Qui and between

that village and Shamshattu, and reconnaissances were made of the western portion of the Sarghashi ridge above Kandar, and the Ashu-Kheyl tower above Kandao was also re-visited.

104. In the course of these reconnaissances, no opportunity was neglected of noting such information as could be extracted from the Maliks or other guides by whom we were accompanied, regarding the portion of the Jowaki territory which still remained unexplored, and also regarding those of the Gali-Kheyl country in which the families and cattle of the enemy were supposed to have taken refuge.

105. Torsapar has already been noticed in this report as a locality involving geographical problems of great interest from a military point of view, and perhaps more thoroughly unknown than any other place of similar importance in close proximity to our frontier. Information had been called for from the head-quarter office, in the course of the hot weather, as to the possibility of occupying this place, which had been long recognised as the chief stronghold of the Adam Kheyl, by British or Native troops. In reply, it had been reported from the district office, on the authority of numerous well-informed persons, that Torsapar was approached by roads used by laden bullocks from the Kohat Pass at Shpilkai and from the Uchalgada Valley; and further, that a track probably existed whereby communication could be established thence with a force in the Pastaoni Valley. It was also reported that the water-supply was undoubtedly good, some authorities saying that in places it had marshy springs like those of Tartara, and others speaking of wells, persian-wheels and cultivation. This last statement could not be reconciled with the position assigned to Torsapar in the sheet atlas, which placed it on the highest point of one of two great parallel ranges separating Kohat from Peshawar, and at the place where this range was met at right-angles, or threw off other chains connecting it with the Kohat and Sarghashi hills.

106. The native information collected in the course of our reconnaissances fully corroborated the above report regarding the water-supply of Torsapar; and the limits of the locality so called were pointed out to us by several reliable persons as commencing with the hamlets of Bakhal Kheyl and Alam Kheyl, behind the hill called Da Kago Sar or Kog Sar, and stretching for at least two miles towards the hills overlooking the Kohat Pass, and including eighteen or twenty hamlets of which the names were given us. Mr. Scott's survey, when plotted, fully cleared up the difficulty suggested by the errors in the old map, and a report was sent to the Quarter-Master-General shewing that it was now ascertained that the range from the Bori-Chena Pass to the Kohat Pass was continuous, and presented no opening through which the drainage of Torsapar could reach the Peshawar valley; but that, at about one thousand yards to the west of the point reached by the reconnaissance on Christmas Day, there was a bifurcation in this chain

and that, between the ranges thus formed, lay Torsapar—a valley* the drainage of which must either run into the Naru Khula or into the Kohat Pass.

107. In submitting this information, it was strongly urged that a fresh reconnaissance should be made with a view to placing a surveying party on the peak shewn to be at the head of the Torsapar Valley, and a project for this was submitted to the Brigadier-General. This was approved of by that officer, but was, as will be seen, rendered unnecessary by orders subsequently received for further operations in the direction referred to.

108. On the 8th January a letter was received from the Military Secretary, Panjab Government, informing the Brigadier-General that negotiations with the Jawakis had failed, and requesting him to state his opinion regarding the measures which should be adopted to effect a strict blockade of the tribe, lasting, if found necessary, into the hot weather. In reply, the Brigadier-General gave the information asked for; but suggested that the blockade should only last for three months, instead of for an indefinite period as contemplated by the Panjab Government, and that the interval, which would bring us to a time of year extremely favorable for military operations, should be occupied in collecting stores in the Khwara, and improving the road between Cherat and that valley, which he was of opinion would prove a more satisfactory base than Bori for protracted operations in the Adam-Kheyl country.

109. This correspondence was forwarded to General Keyes, who expressed himself strongly in favor of a fresh expedition being at once undertaken into the Jawaki country, and deprecated the establishment of a permanent blockade until this measure had been tried. The views he held on the subject appear to have been briefly as follows:—The Gali Kheyl, by frontier custom, could not be held to have committed a breach of neutrality in harbouring the Jawakis, unless the latter were shewn to have used the neutral territory as a base for raids on British territory,

* The name Torsapar tended to confirm the erroneous impression derived from the existing maps that the place was situated on the top of a hill. Sapar in Pushtu is identical with Chappar in Hindustani, and signifies roof, thatch; and thence, thatched huts. It was thought by some tolerable philologists that the sense ' roof ' in which the word is used might be extended to mean tableland, possibly from the parallel instance of the application of the name *Ban-i-dunya*, ' roof of the world,' to the Pamir plateau. The real meaning of the name was some weeks later explained to me by some Torsapar Maliks while on the hill looking into their valley. The Gali Kheyl, it appears, in old times occupied the valley temporarily in their yearly migrations from Tira, and on one occasion returned to find their grass huts, or "Sapars," burnt by some unfriendly neighbours, whence the name "Torsapar," black thatches. My informations pointed to the temporary grass huts in the neighbouring Gulo Tangi (*vide* paragraph 130), saying that these were the kind of huts referred to. The danger of "a little knowledge" on such subjects was exemplified by one of the newspaper correspondents with the force who informed the public that the "Sarghashi" pass was so called from a prominent white rock known as the tiger's tooth from *Shor* (the Persian for tiger) and *Ghash* or *Ghakkh* the Pushtu for a tooth the real derivation being from *Sar* a head or bill and *Ghashai* a pass.

or attacks on our troops. The Jawakis, though driven out of nearly all their villages, were still in possession of a considerable part of their country, and until they were expelled from this, and driven entirely across the Gali frontier, it was impossible to hold the latter tribe responsible for their actions.

110. General Keyes' proposals met with the approval of the Punjab Government, and orders were shortly afterwards received from Army Head-Quarters for a simultaneous advance of General Ross's force in co-operation with the Kohat troops. The earliest date on which preparations could be completed was the 15th January: and it was arranged that both columns should, on that evening, occupy the same positions as they held on the 31st December, and that on the 16th a consultation should be held at Walai as to the measures required for the passage of the Kohat force through the Naru Khula Pass, and such further movements as General Keyes might think necessary to complete the occupation of the Jawaki country.

111. The force arrived at Pastaoni for the second time on the 15th January at about 11 A.M.; and the baggage, under the arrangements suggested by the experience gained in the former advance, began to arrive before 12 o'clock, and was all in camp early in the afternoon. The Kotal was occupied by the same party under Lieutenant-Colonel Gordon as had been before detailed for that duty, and the disposition of the troops on either side of the pass was much the same as on the 31st December, with the exception that the 20th Punjab Native Infantry were detailed to hold the Dand Sar spur during the passage of the baggage, instead of the 14th Sikhs, the latter corps, with the 9th Foot, being taken straight to Pastaoni under Colonel Buchanan's orders. The 20th Punjab Native Infantry, as mentioned by the Brigadier-General, was detained for some hours on the main range to the west of Lieutenant-Colonel Gordon's position by some marauders from the direction of Torsapar, of whose intentions of attempting an attack on the flank of the column we had received information on the previous evening.

112. The different corps were distributed, on arrival, to their former bivouacs, and at 1 P.M., the 9th Foot, Hazara Mountain Battery, and 14th Sikhs were paraded under Colonel Buchanan and directed by the Brigadier-General to make their way, with the Deputy Assistant-Quarter-Master-General, up the spur forming the northern boundary of the Pastaoni Valley, and leading, as has already been described and will be seen from the map, to the Gulo-Tangi Glen.

113. The object of this reconnaissance was to procure information regarding the country to the front, and especially as to the roads leading to the Gali-Kheyel watershed. The hills forming the eastern and southern boundary of the Naru defile were practically held by General Keyes' columns, who were again in possession of the Dargai Sar; but it was thought possible that the Peshawar force might be required to occupy the Mandehar range on the further side of the pass during

the advance of the brigade from Jammu. With this view, Colonel Buchanan was directed to report whether the Mandehar range could be reached in one day by the troops at Pastaoni. He was also directed to ascertain the exact position of the Gulo-Tangi Valley, which, as has been mentioned, we had reason to believe was now one of the places chiefly relied on by the Jawakis for the protection of their families and cattle, and to report whether the village of Walai was likely to be held by them, and how it should be attacked by our columns. The Deputy Assistant Quarter-Master-General was accompanied by some Hasan Kheyls from Spargai, and other guides whose information proved reliable, and whose names are recorded in the Intelligence-book in the Peshawar District office.

114. Colonel Buchanan's column, as described in General Ross's report, met with some slight opposition from a few Afridis who appeared to have come from the party with whom the 20th Panjab Native Infantry had been engaged, and who fired on us from the opposite side of the Hasan-Kheyl Valley on our right (*vide* paragraph 82).

115. A good track, leading with a gentle gradient towards the main range, was followed by the reconnaissance-party; and the spur along which they moved, though covered with scrub jungle, and somewhat steep towards the valleys on either side, was found to be broad and easily traversed along the crest-line. When nearly opposite Walai, a considerable dip had to be crossed, involving a rather steep descent, and long ascent to the point where the spur overlooks the Gulo Tangi, and turns off at right-angles towards the Torsapar watershed, forming the eastern boundary of the glen. The Gulo Tangi was found to be a narrow valley with a considerable amount of level ground, forming a small plateau near its opening into the Walai plain, and ascended by a track said by our guides to be practicable for horsemen and to lead to Torsapar.

The Walai Valley is entirely hid from the Pastaoni side of the above dip, and a small part of it only can be seen from the hill above the Gulo Tangi. Its position, as will be seen from Mr. Scott's map, is peculiar, and, in order to examine it thoroughly, a party of one hundred men of the 14th Sikhs, who were detached with the Deputy Assistant Quarter-Master-General, had to cross the Walai-Pastaoni Valley and ascend a steep, conical hill which forms an underfeature of the range on the opposite side. Between this small peak and the range in question there is a low Kotal, from which a rocky road, not practicable for mules descends in the one direction towards the Pastaoni Valley, and in the other to Walai. The latter is a high valley, irrigated by a small swampy stream rising near the Kotal and running westward towards the village, where the valley opens out and the brook above mentioned joins the main stream, which is formed by the drainage from the Gulo Tangi and Sandalai Kotal (*vide* paragraph 123), and flows eastward with a fine body of beautifully clear water towards Pastaoni.

116. Wali was found unoccupied, though smoke was seen coming from several places in the Gulo Tangi, the entrance to which is about one mile above the village. The latter consist of fourteen houses, with one tower—a very fine one—and is situated in a tolerably wide expanse of cultivation, irrigated by the streams above described. The road from the Kotal at the head of the smaller Walai brook, by which the escort with the Deputy Assistant Quarter-Master-General returned towards Pastaoni, zigzags sharply down the hillside, and joins another road—the principal one between that village and the Naru Khula—which follows the bed of the stream along the bottom of the valley. The water in this is from one to two feet deep at Walai, with a swift current, but disappears entirely before reaching Pastaoni, as mentioned in describing the water-supply of that place. The road from Pastaoni to Walai along this watercourse is a very fair one, and was used next day by the baggage of the force. It runs for nearly a mile, after leaving Pastaoni, through cultivated fields, beyond which the valley narrows, and is filled in places with a dense wood of wild-olive trees. Nearer Walai it winds for some distance through low rocky hills, and, just before coming in sight of the village, crosses a pool in the river-bed upwards of four feet deep, round which a causeway had to be constructed by the sappers to enable the mules to pass. We were informed by the Hasan Kheyl that this stream occasionally comes down in flood, filling the valley and submerging the Pastaoni fields. In the hot weather, again, it is said to be almost dry, the inhabitants of Walai depending for water on holes dug in its bed.

117. Colonel Buchanan's party returned to Pastaoni at dusk, and reported that more than one spur leading to the watershed above Toraspar appeared practicable for infantry and mule guns, but that the distance a force moving by this line to the Mandehar Sar would have to traverse, was more than could be conveniently accomplished in a single day. Orders were accordingly issued that the force would march next morning from Pastaoni, the Brigade under Colonel Doran, together with the commissariat, being directed to halt at Walai, and Colonel Buchanan's Brigade occupying ground to be selected for them in the Gulo Tangi. Walai was chosen as the Brigadier-General's head-quarters, as it had been arranged that he should meet General Keyes there at 9-30 A. M.

118. During the advance to Walai on the morning of the 16th the hills on the right were occupied by the Brigade under Colonel Buchanan, who moved along the same line as on the previous evening pushing the 20th Punjab Native Infantry forward, under cover of the Hazara Mountain Battery, to the crest of the rocky hill overlooking the Gulo Tangi. A portion of Colonel Doran's Brigade crowned the hills on the opposite side, which it was thought well not to neglect, though they were commanded to some extent by General Keyes' position on the parallel range above them.

119. The baggage, proceeded by an advance-guard of the same Brigade, moved as has been explained, along the road at the bottom of the valley.

120. The Kotal at the head of the smaller Walai Valley, mentioned in the description of the previous day's reconnaissance, was seized by the skirmishers of the Rifle Brigade, who arrived there almost at the same moment as some Goorkha skirmishers from the Kohat force, who were seen descending the hills to the south of the village. A few shots were fired at, and by, a small party of the enemy, who appeared to have passed the night in the village, and who retired in the direction of the Gulo Tangi.

121. General Keyes reached Walai a few minutes after our arrival accompanied by the Commissioner and other officers, and explained to General Ross that he could materially assist the operations of his troops, who were then engaged in crowning the heights above the Naru Khula,* if, he could send a strong party of infantry with mule-guns to the watershed overlooking Torsapar; the object of this movement being, to prevent such of the enemy as had been driven across the Gali-Kheyel boundary from advancing to attack his troops and to threaten the rear of the defenders of the Narai Valley.

122. The topography of the country beyond Walai belongs more correctly to the description of the operations of the combined force on the 18th, 19th, and 20th of January; but a brief account of its leading features is required here, to explain the movements of the Peshawar column on the 16th and 17th.

123. The Walai-Pastaoni Valley; as may be seen from the one-inch map attached to this report, is a long valley running generally from south-east to north-west, and separated from the drainage of the Naru Khula, flowing towards Jammu, by a low Kotal formed by a spur from the Sandalai Sar—a somewhat flat-topped hill on the southern and western side of the Gulo-Tangi Glen.

124. This valley has already been described as far as Walai, where as has been mentioned, it is joined by a small tributary stream from the east. Its northern boundary is formed by spurs from the Sandalai Sar and Torsapar hills, and to the south consists of spurs from the Ghariba range—one of the highest points, in which the Dargai Sar overlooks Jammu, and throws out a long, unbroken spur to the west, the extreme end of which commands the northern entrance to the gorge of the Naru-Khula Pass. At about a mile above Walai, a considerable tributary joins the stream through the valley from the north coming down the Gulo-Tangi-Glen.

125. The valley is here wide, and, where not cultivated, is covered with a rather dense jungle of wild-olive and palai† trees which extends up both sides of the Gulo-Tangi Glen. Towards the Sandalai Kotal the valley ascends

* Khula means pass or gorge, literally "mouth." The name of the pass in Pushtoo is I think *Da Naru Khula* or the 'pass of Narai,' the other being the name of a few huts near the Northern entrance of the defile.

with a very gentle gradient, and the road, like that from Pastaoni to Walai, is generally remarkably good, though it frequently crosses the stream, and might, from this reason, be less suitable for baggage animals after heavy rain.

126. The position at Walai was a strong one, though requiring rather more men to hold it than were at Colonel Doran's disposal. It is completely commanded by hills, as may be supposed from the above description; but those immediately bordering the valley are small rocky knolls, underfeatures of the spurs behind them, which afford excellent positions for pickets. The plateau at the mouth of the Gulo-Tangi Glen, which was occupied by Colonel Buchanan's Brigade, proved also well suited for defence, owing to a similar conformation of the hills immediately surrounding it. The village of Walai is almost surrounded by streams and swampy ground, and the troops bivouacked there suffered much from the cold and damp. In the Gulo Tangi, on the contrary, Colonel Buchanan's Brigade were in excellent quarters on the dry slopes on either side of the stream, with an endless supply of firewood close at hand.

127. The position of the troops on the 16th January will, it is hoped, be understood from the above description. .

128. On receipt of the instructions from General Keyes mentioned in paragraph 121, orders were despatched at once to Colonel Buchanan to march towards the Torsapar watershed. This officer was at the time with the main body of the Brigade, consisting of the Hazara Mountain Battery, 9th Foot, and 14th Sikhs, which was separated from the advanced regiment (the 20th Panjab Native Infantry) by the dip in the spur mentioned in the report of the reconnaissance of the 15th. The Deputy Assistant Quarter-Master-General, who was accompanied by Mr. Scott, was directed to make his way to the 20th, and request the Officer Commanding to move forward in anticipation of Colonel Buchanan's orders. The skirmishers of this regiment had seen a good many cattle driven up the Gulo-Tangi road; but it had been impossible to send men down to intercept these, and it was now hoped that we should cut them off at the top before they could descend into Gali-Kheyl country. The ascent was, however, long and steep, though the spur was nowhere very precipitous, and the advance was delayed for some time by a party of the enemy whom we found strongly posted among the rocks, and whom it was impossible to dislodge until their flank had been cleverly turned by some of the 20th. Sixty or seventy head of cattle only were seized in the lower part of the Gulo-Tangi. The 20th were joined on the crest of the hill by the rest of the Brigade,

129. The view which met them was a very striking one, comprising the greater part of the Torsapar Valley, and the southern slopes of the Bori and Uchalgada ranges in the one direction, and a vast expanse of hills and plain to the south, including the Naru Khula and Mandehar Sar hills, on one of which, known from its shape as the

Magak ('the rat'), some of the Kohat troops were seen exchanging occasional shots with the enemy. A clever sketch of the Naru Khuta, as seen from this point, was taken by Lieutenant Dun.

130. To our left, at a distance of a few hundred yards, there was a rather low saddle between the hill we stood on and the Zer Sapar—a lofty peak projecting from the main range and directly overlooking the Torsapar Valley.

The road from the Gulo Tangi winds gently down to Torsapar after crossing this saddle, where it is joined by a second road, apparently a good bridle-path, coming from the Naru Khula by a valley known as the Tariqa Khwar.

Mr. Scott, who arrived on the crest with the skirmishers, had two hours' satisfactory work with his plane-table, and was able to fill in a great part of the blank in the map which his previous observations had shewn must be occupied by the valley now before us. The Hazara Mountain Battery and the greater part of the Brigade were withdrawn to their bivouac in the Gulo Tangi by the spur up which they had advanced, and the Deputy Assistant Quarter-Master-General, with Captain Cavagnari, Deputy Commissioner, who had also accompanied the advanced party, returned by the road down the same glen. This road was found to be a rough one, and much narrowed in several places by projecting rocks. Three working-parties of fifty men each would make it a fair baggage-road in about four hours. In several places the glen opened out, forming plateaus from two to three hundred yards long by one hundred broad, on which grass huts had been constructed, which appeared to have been occupied for many weeks by families of Jawakis with large numbers of cattle. An old man, and several women and children, were taken prisoners in their huts, and were released next day. From their statements we learnt that their friends had retreated into Gali-Kheyl territory. Captain Cavagnari had been met at the crest by a Jirga of Gali Kheyl on their way to Walai, accompanied by Nawab Bahadur Sher Khan, the Government Agent with the pass Afridis.

This party was taken by us down the Gulo-Tangi road, and passed the night at Walai with Colonel Doran's troops.

131. Ground for the bivouacs for both Brigades had been taken up in the course of the day by Captain Brownrigg in the position already described. The night passed quietly, with the exception of a volley fired by some twenty or thirty muskets and rifles into Colonel Doran's camp from the small Kotal towards Pastaoni, which appears to have been thought too far distant to be included in the line of outposts. The bullets fell, fortunately without doing any mischief, into the fires of the Gali-Kheyl Jirga; and on the latter explaining that they were friends, the enemy ceased firing and disappeared.

132. Early next morning (17th) General Keyes again visited Walai. From information which had been received during the last few days, it was known that no part of the Jawakis territory was now occupied by the fighting-men or families of the tribe, with the exception of a valley hitherto unexplored by our troops, which joins the Naru Khula from the west, and was believed to commence at the watershed above Kui—a Gali-Kheyl village in the Kohat Pass which was believed to have afforded shelter to a considerable number of the fugitives. General Keyes proposed that the Peshawar Force should join his troops in an expedition up this valley, and that one or more regiments should also be sent to such other parts of the watershed forming the Jawaki Gali-Kheyl boundary as had not been visited. The Peshawar Force was supplied with rations sufficient to last to the evening of the 19th, and, as the proposed expedition would considerably increase their distance from their present base, it was arranged that they should return to Peshawar by the Kohat Pass, and that four days' supplies should be collected for them at Kohat, and forwarded by the civil authorities to Jammu.

Orders were accordingly sent to the party on the Pastaoni Kotal to return to the Sarghashi camp at 3 P.M., with the exception of two companies of the 27th, which were directed to join the head-quarters of their regiment at Walai, bringing with them the signalling parties. Heliograph messages were sent, before closing the station, to the Quarter-Master-General for His Excellency's information, and by the Commissioner to the Governments of India and the Panjab, reporting the progress of affairs up to date, and the proposed movements of the Peshawar Force.

133. Before General Keyes left Walai, his sanction was obtained to the despatch of a party to the Zer Sapar peak, to complete the survey and reconnaissance of the Torsapar Valley; and the 14th Sikhs, 20th Panjab Native Infantry, and Hazara Mountain Battery, under Colonel Buchanan, were directed to march thither at once, accompanied by the Deputy Assistant Quarter-Master General and Mr. Scott. Colonel Doran's Brigade was, at the same time, despatched in the direction of Pastaoni, to which, according to information which had been received, a few Jawakis had returned, and were hiding, with their cattle, and families, near the spring to the south of the village. A company of sappers under Lieutenant Dove were also directed to accompany General Keyes back to his bivouac near the northern entrance to the Naru Khula, and to repair the road thence through the pass to Jammu.

134. Colonel Buchanan's party reached the Kotal at the head of the Gulo Tangi, without opposition, and took up a position, covering with his guns the advance of the reconnaissance-party up the Zer Sapar peak. The latter were accompanied by Captain Cavagnari, and escorted from the Kotal to the hill-top by a deputation of Gali Kheyl, who appeared extremely solicitous that no *contretemps* should

occur while we were on the border of their territory. The reconnaissance to the Zer Sapar peak was a most successful day's work. Not only did we see the whole Torsapar Valley, including the upper villages of Alam Kheyl and Bakhel Kheyl, and the road from them to the Spintang, which were not visible from our position of the previous day, but a magnificent view was obtained of the Peshawar and Kohat Valleys, and of the Kotal of the Kohat Pass, as well as of many of the principal places in the latter—among others, the point above Zargun Kheyl, where the nullah carrying the drainage of the Torsapar Valley runs into the pass. The Sarghashi ridge could be seen as far as Kandao, but the upper and lower camps of the troops left before Bori were hidden by the top of the Kog Sar. The Torsapar Valley is a remarkably fine one, cultivated throughout, with the exception of a narrow strip of thorny jungle, apparently the site of a Ziarat, running down the centre. Several of the hamlets are situated in the middle of the plain, but the greater part of them are immediately under the hills forming its northern and southern boundaries. At the further (western) end of the valley, two passes were visible—one, evidently a very low one leading to Shpilkai in the Kohat Pass; and the other into the Uchalgada Valley at Kalan Kheyl.

The difference of level between Torsapar and the Uchalgada Valley is very great, and the hills separating them, which, looked at from Kandar, appear a considerable range of mountains, do not rise more than from five to eight hundred feet above the Torsapar plain, and, viewed thence, very much resemble the Sharghashi ridge seen from Bori. Water is near the surface, and each hamlet appeared to have its well. Cattle are generally watered from springs and tanks, which dry up in summer, with the exception of a few springs towards the lower end of the valley. Each hamlet has several towers, many of which are even finer than those destroyed in Bori; and, from the size and appearance of the houses, it is evident that the Torsapar clan is more wealthy than the other sections of the Adam Kheyl.

135. While Colonel Buchanan's party were making their way towards the Zer Sapar peak, the Kohat troops had been employed in driving the enemy away from the crest of the steep range immediately in front of the northern entrance to the Naru Khula. A considerable body of Afridis had collected to oppose them, and were visible from the head of the Gulo Tangi, where the Hazara Mountain Battery had been left in position with the 20th Panjab Native Infantry and 14th Sikhs. The range was rather a long one, but a considerable number of shells were fired by the battery, which, on subsequent examination of the spot (on 18th), were found to have burst exactly above the points aimed at. The reconnaissance-party returned to their bivouac in the Gulo Tangi as soon as the survey operations were completed. The latter included a large amount of plane-table work, and a most valuable round of theodolite observations, as well as interesting and accurate landscape sketches by Lieutenant Bartram, R. E., and Lieutenant Dun, attached to the Quarter-Master-General's Department.

During the day, further orders had been received from General Keyes directing both Brigades of the Peshawar Force to march next morning to join his troops at the Naru Khula. General Ross was informed that it was improbable that he would be attacked, as the crest-line of the high hills on both sides of the valley to the west of the Sandalai Kotal was held by the Kohat troops; but he was requested to take due precautions for the protection of his rear, and to crown such portions of the lower wooded ranges on his right and left as were found to command the road, and might afford cover to small parties of the enemy.

136. All preparations were made for evacuating Walai, and at daylight next day (18th), after the tower had been blown up, the force moved off, Colonel Buchanan's Brigade furnishing the advance-guard and right flanking parties, including an escort for a reconnaissance, accompanied by Mr. Scott, to the top of the Sandalai Sar, and Colonel Doran's Brigade crowning the hills to the left and protecting the rear.

137. The country as far as the Sandalai Kotal has already been more or less fully described. The road thither from Walai winds through low-wooded hills, commanding it on either side, with an almost imperceptible gradient to the Kotal. Beyond this, the track leads generally along the left side of a remarkably beautiful valley known as the Sandalai Khwar, running approximately from east to west. The hills on the right, as may be seen from the map, form a semi-circle round the upper part of the valley, and descend in gently-sloping spurs towards a stream running in a deep bed below. On the left the valley is bounded by a long spur, the northern side of which slopes rather steeply towards the road. The whole country from the Kotal downward is covered with wild-olive forest, with a rather dense undergrowth of thorny jungle. At about two miles from the Kotal, the valley is joined on the right by a nullah already mentioned, named the Tarina Khwar, coming from the direction of the Zer Sapar peak. It here opens out, and the stream runs for about three-quarters of a mile through an almost level plain, one thousand yards wide, and partly covered with jungle, to the entrance of the Naru Khula, a narrow gorge through which runs the road leading to Jammu, which will be described hereafter.

138. The column was met on the road by General Keyes, who requested that one Brigade (Colonel Doran's) should be directed to march on through the Naru Khula, the heights on either side of which were still held by the Kohat troops, and that the other Brigade should bivouac for the night on ground to be chosen for them near the northern entrance to the gorge. Colonel Doran's Brigade halted for a couple of hours on the plain at the entrance to the Naru Khula while the road was being further repaired by the sappers, and then moved on to Jammu. In the afternoon, the Deputy Assistant Quarter-Master-General was directed to join General Keyes at the top of the ridge

shewn as "guide's piquet" in the 4"-1 mile sketch (attached), and was accompanied thither by Mr. Scott. From this position General Keyes pointed out the lines by which he wished Colonel Buchanan's Brigade, and a portion of the Kohat troops to move to the watershed above Kui on the following day. The head of the valley running from this point on the Gali-Kheyl Jawaki frontier is marked by a sharp peak (shewn in the above sketch), which had already been intersected from more than one point in Mr. Scott's survey. From the guides' piquet ridge the lower half of the Torsapar Valley was again visible, as well as the Peshawar cantonment and valley; and Captain Wynne, Superintendent of Signalling, was sent thither next morning with a view to opening communication with the station on the tower of the cantonment church. Ground had been previously selected under General Keyes' orders for the bivouac of Colonel Buchanan's Brigade. The Hazara Mountain Battery was placed at the mouth of the gorge immediately below a detachment of the Guide Corps, the 20th on the hill shown as "20th P. N. I. piquet" in the sketch, the 9th Foot on the side of the stream outside the pass and facing to the north, and the 14th Sikhs farther up the valley to the east towards the Sandalai Kotal. The high ridge to the north of the camp was, as has been mentioned, occupied by the Guides, but it was also thought necessary to post pickets from Colonel Buchanan's Brigade on the bold underfeatures terminating the spurs from this crest-line and overlooking the valley.

139. The valleys towards Kui and the Sandalai Kotal were also closed by strong outposts with advance parties. Notwithstanding these precautions, a very heavy volley was fired into camp from a knoll on the same side of the Kui Valley as the 20th piquet, but separated from the latter by a nullah. A dozen or more bullets fell among the 9th fires, and others into those of the Hazara Mountain Battery and Guides, one of the latter (a sepoy) being unfortunately mortally wounded.

140. Next morning (19th January), Colonel Buchanan's Brigade and the frontier regiments detailed on the previous evening were under arms soon after daylight, and marched under General Keyes' orders up the valley leading towards Kui. The hills on the left were crowned by a Frontier Force regiment. Colonel Buchanan's Brigade and the Hazara Mountain Battery marched by the road—a particularly good one—up the centre of the valley, preceded by a long line of skirmishers, and the Guides moved along the ridge occupied by them on the night before, towards the peak at the head of the valley. The latter had been occupied by the enemy during the night, and their fires were found still burning there when our troops arrived; but, beyond a few stray shots, no opposition was attempted. Mr. Scott accompanied the Deputy Assistant Quarter-Master-General to the top of the sharp peak above mentioned, and thence, crossing the deep valley to the south, ascended the hill through which the Jawaki boundary is shewn (on the same map) to run. A body of men and families, in all over two hundred, with a few cattle, were seen in the nullah running past Kui, and were said by our

native informants to be the Jawakis who till the last few days had been living in and near the Naru Khula.

141. Before starting for the Kui watershed, permission had been obtained from General Keyes to send a party of one hundred men of the 20th Panjab Native Infantry, with Captain Brownrigg and Lieutenant Dun, to investigate a track reported to be a good one by one of the Harkaras temporarily attached to the office of the Department, and leading from the hill occupied by the 20th piquet round the western shoulder of the Mandehar Sas, and by a pass known as the Mandehar Khula into the Bazid-Kheyl Valley, and thence across the Bazid-Kheyl Kotal to Jammu. This track was shewn by Captain Brownrigg's report to be a very fair one, which could be easily made into a good baggage-road by a company of sappers in six hours' work. Its merits as a road turning the Naru Khula will be further explained in describing the reconnaissance of the Bazid-Kheyl Valley.

142. The advance on the 19th to the Gali frontier above Kui may be said to have terminated the operations against the Jawakis. No portion of the territory of the tribe now remained which had not been overrun by our troops. A deputation of the Gali Kheyl from the village of Kui had been informed by General Keyes that the sincerity of their professed neutrality would be tested by the future conduct of the Jawakis whom they had allowed to cross their border; and it is believed that the Gali generally were reminded in somewhat similar terms of their obligations by the Political authorities. However this may be, the result of the last expedition of the combined forces from Kohat and Peshawar, thus terminated on the 19th, has been that, since that date, not a single shot has been fired by night or day by the Jawakis. The blow to the prestige of the Gali Kheyl inflicted by the operations of the last few days had been hardly less than that suffered by the other section of the tribe with which we were engaged. Torsapar, and its position and approaches, have been for years enveloped in lies and mystery by the pass Afridis, and it must have been an invaluable lesson to them to see the stronghold, which they and their neighbours honestly thought impregnable, approached and overlooked on four successive days by British troops, on the lines which, with good reason, they considered least liable to attack.

143. The troops returned to the Naru Khula on the evening of the 19th, and orders were issued by General Keyes for the march of the whole force bivouacked there to Jammu and Turki on the following morning.

144. The baggage of the whole force was packed at dawn and sent through the pass to Jammu, as soon as the road was reported open and the crowning-parties were in position. The 20th Panjab Native Infantry were directed to retire along the crest of the hill to the right, known as the Bazu Kamar, or Hawk's crags, detaching a party of the hundred men with Mr. Scott to the top of the Mandehar Sar, and the left of the

force was similarly protected by the frontier troops. The Guides' piquets on the crest of the Torsapar ridge were first withdrawn, and were followed by those of the 9th, 20th, and 14th on the lower spurs to the north of the position, the whole passing through the bivouac of the 9th and retiring down the pass. The remainder of Colonel Buchanan's Brigade then moved down the pass, forming the rear-guard, the flanking parties on the heights commencing their retirement on hearing a signal fired by that officer's orders.

145. Colonel Buchanan's Brigade was directed to occupy Jammu, relieving Colonel Doran's troops, which were ordered to march to Kohat. General Ross had transferred his head-quarters to Jammu on the morning of the 19th, and left for Kobat on the 20th, taking his staff with him, with the exception of the Deputy Assistant Quarter-Master General, who, under instructions from the Head-Quarters office, was permitted to remain with Colonel Buchanan's Brigade, and was temporarily attached to General Keyes' staff.

146. Many opinions were expressed regarding the relative difficulties of the Nara Khulu and Bori-Chena Passes. As regards the passage of baggage, the road through the Naru Khula is an extremely easy one, almost level throughout, but, no doubt, even more liable than that through the Bori Pass to become impracticable in rainy weather, as the stream which runs along, and occasionally over, the roadway was, even when passed by our troops, in places a foot or more deep, with a strong current. Its bed, however, instead of consisting of blocks of hard limestone, is composed of a limestone of a more friable character, stratified horizontally, and affording, even when wet, an excellent foothold for baggage animals. The hills on either side of both passes rise almost perpendicularly from the roadway, but the crest-line of those enclosing the Naru Khula, and indeed the whole range to the south of the Torsapar crest-line, differ materially from the northern slopes towards Peshawar, from the fact of the rocks being more disintegrated, and presenting less formidable obstacles to the advance of troops than the perpendicular blocks characterising the stratification of the Bori hills; they are, however, very steep, and in many parts, especially towards Jammu (as will be noticed in describing the Dargai Sar), the spurs can only be ascended in single file, and troops moving up them in the face of an enemy would have to be strongly supported by artillery. Another feature of the Naru Khula hills, and even more so of the hills bounding the valley towards the Sandalai Kotal, which must be considered in comparing the passes, is the greater distance of the crest-lines from the roadway below. This, with a numerous and active enemy, would necessitate the employment of a large number of men in forcing a passage for a column with baggage from Jammu to Walai by the Naru Pass, than would be required to reach the same spot from Bori. The hills between the Torsapar watershed and that of the Ghariba range are also all, more or less, densely wooded, while the bare rocks on the northern slopes are almost entirely free from jungle.

147. The villages in the Jammu Valley occupied by Colonel Buchanan's force are generally built on the rugged mounds left by the deep nullahs by which the plain is intersected, and afford a line of extremely strong posts mutually supporting each other and well supplied with water. Most of the troops were housed in such of the huts as remained unburnt, and the Brigade had every reason to be well satisfied with its quarters.

148. General Keyes thought that he might find it advisable to send a portion of the force back to Kohat through the Bazid-Kheyel Valley, the Kotal between which and Jammu had been visited by the reconnaissance-party despatched from the Naru Khula on the 19th. The upper portion of the valley is in independent (Jawaki) territory, further down it belongs to a section of the same tribe within the British border, whose loyalty at the outbreak of hostilities had been somewhat doubtful. The road leading through it is an important one, being the most direct line between Kohat and Jammu; but beyond this little was known of it. The sappers and miners, with working and covering parties of 9th and 14th Sikhs, were sent on the 21st to repair the road across the Kotal. They found it had been destroyed in several places, and that breastworks had been thrown up on several points commanding the approaches to the Kotal.

149. On the same day the Deputy Assistant Quarter-Master-General, accompanied by Mr. Scott, went with a party of native infantry under Captain Brownlow, 5th Punjab Infantry, to the top of Dargai Sar peak. The ascent from Jammo is in many places very difficult as mentioned in paragraph 146, though it is said to be somewhat less so from Ghariba, on the line by which it was first reached by the frontier troops on the 31st December. The descent towards Walai appeared rather steep, though a track exists which is practicable for mules and ponies. In the direction of the Naru Khula the gradients are more gentle, the track running along a broad, unbroken spur, already mentioned as forming the southern boundary of the valley between the Sandalai Kotal and the gorge of the Naru Khula.

150. On the 22nd, Colonel Buchanan's Brigade marched to Turki, after blowing up sixteen towers in Jammu, and on the 23rd to Kohat. On the morning of the latter date, the Deputy Assistant Quarter-Master General, accompanied by two hundred of the 20th and a similar party of the 14th Sikhs, marched from Turki to the Bazid-Kheyel Kotal by a very rough mule-road, crossing several small parallel ranges of rocky hills shewn in the map. From the Kotal, the party, which was accompanied by Mr. Scott, made its way along the ridge forming the southern boundary of the valley and separating it from the Tortang—the defile through which the Kohat force first advanced in the hot weather, when attempting to cut off the Jawakis in the Gandiali Pass. The ridge is remarkably flat and broad at the top, and descends in a series of rocky terraces to

the valley below. The latter* is generally narrow, though the road is good, leading in places through cultivation.

151. The open pass round the western shoulder of the Mandehar Sar, mentioned in paragraph 141 as a practicable line whereby the Naru Khula may be turned, is for a long distance under command of artillery-fire from this ridge. The latter slopes gradually towards the west, and the path, which is here difficult for mules, winds steeply down towards the Bazid-Kheyl villages. A second track, more easily practicable for laden animals, is said to descend at the extreme end of the ridge, half a mile further to the west. From Bazid Kheyl the road is a very good one through open country to the British village of Shaikhan, beyond which it traverses a pass through low barren hills and enters the Kohat Valley.

152. Colonel Doran's Brigade left Kohat for the Peshawar Valley on the 22nd January, and were followed by the second Brigade on the 24th. The Kotal of the Kohat Pass, and numerous peaks on either side, had been fixed on Mr. Scott's survey from the Zer Sapar hill, the peak above Kui, and from the Dargai Sar; but, on arriving at the Kotal on the latter date it was found that no use could be made of these points, as the hills were thickly covered with mist.

153. Rain continued to fall throughout the day, and, with the exception of the portion of the road between the Torsapar nullah and Akhor, it was found impossible to accomplish the survey of the Kohat Pass with which it was hoped to complete the map of the Adam-Kheyl country and conclude the operations of the Peshawar Field Force.

154. It is satisfactory to be able to add that, with the sanction of the Panjab Government, the survey of the pass was finished by Mr. Scott at the beginning of March, when the Guides Corps marched through after the final submission of the Jawakis.

* NOTE.—The northern slope of the Bazid Kheyl valley has, by mistake, been omitted in the accompanying map. The character of the spurs is, however, sufficiently clearly shown by the ravines.

(Sd.) J. M. TROTTER, *Captain*

Deputy Assistant Qr.-Mr.-Genl., Adam-Kheyl Field Force

Annexure A.*Detail of the Force at Mackeson on the 3rd December 1877.*

Regiment.	Present fit for duty.			Remarks.
	European Officers.	Native Officers.	Non-commissioned Officers, Rank and File.	
I-C, Royal Horse Artillery...	3	<i>Nil</i>	50	
13-9 Royal Artillery ...	5	<i>Nil</i>	85	
2-9th Foot ...	15	<i>Nil</i>	559	
51st (King's Own) Light Infy.	19	<i>Nil</i>	514	
4th Battalion Rifle Brigade...	5	<i>Nil</i>	186	
17th Bengal Cavalry ...	8	10	326	
Sappers and Miners ...	3	4	194	
14th Sikhs ...	5	13	485	
20th Panjab Native Infy. ...	8	12	466	
22nd " " "	8	13	419	
27th " " "	8	10	506	
Staff " " "	20	...	...
Total ...	107	62	3,790	

WALTER J. BOYES, *Captain,*
Deputy Assistant Adjutant-General.

Annexure B.*Distribution of Baggage Animals for the advance upon Bori, 3rd December 1877.*

Corps.	Baggage mules.	Pakal mules.	Total.
I-C, Royal Horse Artillery ...	11	3	14
13-9 Royal Artillery ...	14	2	16
Royal Artillery Staff ...	1	.....	1
2-9th Regiment ...	126	18	144
51st Regiment ...	134	16	150
Rifle Brigade ...	51	10	61
14th Sikhs ...	63	11	74
20th Panjab Native Infantry ...	84	10	94
22nd " " "	84	10	94
27th " " "	89	10	99
Sappers and Miners ...	63	5	68
General Staff ...	7	.....	7
Signallers ...	1	.....	1
Postal Department ...	1	.....	1
Spare ...	4	.....	4
Total	733	95	828

Annexure C.

Copy of Peshawar District No. 107C., dated 27th November 1871.

Field-equipment for Column proceeding to the Adam Kheyel frontier.

Hospitals.—British Infantry and Native General Hospitals will be at Fort Mackeson as explained to the principal medical officers of each service, and in separate memorandum to Executive Commissariat Officer.

Field Hospitals.—Each corps will take one bell-tent across the frontier for the temporary shelter of sick and wounded. British Infantry regiments will be furnished with four tarpaulins, and each native regiment with two tarpaulins, for hospital purposes. The Royal Horse Artillery and each company of sappers will similarly take two tarpaulins for hospital purposes.

Doolies and Dandies.—Five per cent. of dandies will accompany the force across the frontier.

Five per cent. of doolies will keep up the communication between the front and the general hospital.

Pakals.—Five per cent. for all arms.

Tools.—One mule per corps for felling axes, and bills for cutting jungle, &c.; one mule per corps for entrenching-tools.

Private Baggage, Soldiers'—

British Soldiers.

One greatcoat and two blankets to be carried for each man.

One mule per company for cooking-pots.

Native soldiers', Infantry :

Three mules per company, including cooking-pots; and for sappers, as per separate memorandum.

Private Baggage, Officers'—

General Officer	...	... One mule.
Staff Officers	...	... Half mule each.
Field	...	... " "
Other Regimental Officers	...	... One-third mule each.
Mess	...	... One mule.

Officers' servants and horses—

One servant to each officer, and one pony and syce to each mounted officer.

Departments—

Quarter-Master-General's Office :

One mule for instruments.

One mule for signalling instruments.

Ordnance Department :

The Commissary of Ordnance will establish a dépôt at Mackeson for blasting powder and other stores likely to be required at once by the sappers and miners, and for picks and pharwahs for a working-party of 300 men.

Annexure D.

Return showing the numbers of killed and wounded in the Adam-Kheyel Field Force.

Dates.	Corps.	Killed.	Wounded.		Remarks.
			Severely.	Slightly.	
Decr. 1877 ...	Royal Artillery	...	...	1	
Ditto	2-9th Regiment	...	...	2	
Ditto ..	14th Sikhs	1	6	4	
Ditto ...	20th Punjab N. Infy....	2	4	3	
Ditto ...	27th , ,	...	1	...	
	Total	3	11	10	
Ditto ...	Camp-followers	1	1	...	
	Total	4	12	10	

Annexure E.

Dated Camp Sarghashi, 16th December 1877.

From—CAPTAIN J. T. WRIGHT, R. E.,

To—CAPTAIN J. M. TROTTER, Deputy Assistant Quarter-Master-General.

I HAVE the honor to report, for the information of the Brigadier-General Commanding, that I have carried out the following surveying operations between 6th and 16th December.

The positions of the summits of the hills surrounding the Bori and Ashu-Kheyel Valleys have been fixed by triangulation, and their heights determined by means of vertical angles.

The directions of all the ridges and spurs have been determined.

A compass-traverse along the foot of the hills through which the Sarghashi Pass runs, has been made from the Kui and Taruni defile to the village of Kandao.

Compass-traverses have been made along the Sarghashi Pass and along the new road made by the sappers and miners.

The positions of all the villages in the Bori and Ashu-Kheyl Valleys have been fixed by triangulation from the ends of a small base line measured in the Bori Valley, as well as the direction and extent of nullahs, &c.

The triangulation depends on a base line measured in the plains 3,000 feet long, in a direction parallel to the Sarghashi range of hills, and all the principal points are connected with any known visible stations such as Fort Mackeson, Peshawar church, &c. ; and check measurements between points fixed by triangulation have been made where practicable.

The instrument used has been a nine-inch ordinary theodolite—a quite new instrument, and of the accuracy of which I have had proof prior to these operations.

The readings of a carefully corrected aneroid barometer have also been taken at all the theodolite stations.

A nnexure F.

24th December 1877.

The Force to-morrow will furnish a moveable column, distributed in two Brigades, as follows :—

No. 1 Brigade—

Under Colonel Doron, C.B.:

- Two guns Royal Horse Artillery.
- Sappers and Miners.
- 150 men 9th Regiment.
- 27th Punjab Native Infantry.

No. 2 Brigade—

Under Colonel Buchanan, 9th Regiment :

- Hazara Mountain train battery.
- 120 men 9th Regiment.
- 300 " 14th Sikhs.
- 300 " 20th Panjab Native Infantry.

2. No. 2 Brigade will march from the burnt houses below the picket ridge as punctually as possible at 6-30 A. M. It will move across the valley, and a part will be detached from it to crown the bluffs at the foot of the Dand Sar spur, while the bluffs at the foot of the spur on the proper right of the pass are being crowned by No. 1 Brigade.

No. 2 Brigade will then move under Colonel Buchanan's orders towards the top of the Dand Sar hill.

The objects of the reconnaissance are as follows :—

- (1).—To place a surveying-party on the top of the Dand Sar.
- (2).—To detach a sufficient party to the crest of the Bori-Pastaoni Pass, down which a party will return to camp, accompanied by the Deputy Assistant Quarter-Master-General and Commanding Royal Engineer.
- (3).—To report carefully whether the Bori-Pastaoni Pass is, as is believed, sufficiently commanded by the hills on the right, both in the ascent from Bori and towards the Pastaoni Valley, or whether it would be necessary to detail a second column to occupy the heights on the left (east), in the event of a column being sent through the pass.
- (4).—To obtain such topographical information regarding roads, &c., as is procurable, and to carry out such further orders as may be communicated hereafter to Colonel Buchanan by the Deputy Assistant Quarter-Master-General.

The Officer Commanding No. 2 Brigade will ascertain that each detachment under his orders is fully equipped with dandies (with filled water-bottles), pakals, and hand-bhisties. Pakals are to be filled at the Spintang stream.

Both Brigades will take one day's cooked rations in pouch.

The Brigade under Colonel Doran will be responsible for the protection of the right of the escort returning through the pass, and, with this view, will provide such parties as the Officer Commanding may consider sufficient to occupy any ground which may be found overlooking the pass road. The sappers and miners will be employed on such work as may be found for them by the Officer Commanding the Brigade.

The Royal Horse Artillery elephants, under Colonel Doran's orders, will move by the new road to the crest of the ridge, escorted by two companies 27th Panjab Native Infantry.

Fifty men of 9th Regiment and fifty of 20th Panjab Native Infantry will hold the ridge throughout the day; the 27th Panjab Native Infantry furnishing the escort for the Royal Horse Artillery guns detached to the Taruni end of the ridge.

The Officer Commanding No. 2 Brigade will ascertain that the men of the detachments under his command have been carefully examined by medical officers of regiments, and that no men are allowed to accompany the advance who are unfit for hill-work. He is to time

his retirement from the crest of the Pass so as to reach the foot of the picket hill by dusk at latest.

For favor of insertion in Field Force orders.

J. M. TROTTER, *Captain,*
Deputy Asst. Quarter-Master-Genl., Field Force.

Annexure G.

30th December 1877.

MOVEMENTS OF RIGHT BRIGADE.

The 20th Panjab Native Infantry will follow the same line as on the day of the reconnaissance.

The Mule Battery will follow 20th Panjab Native Infantry to the point on the Dand Sar spur reached by them on Christmas Day, and, when they receive orders from Colouel Buchanan, will descend the track to their left front, get on to the pass road, and join Colonel Doran at the top of the pass.

The 14th Sikhs will occupy the Dand Sar spur overlooking the right of the pass, and will not move thence until all the baggage has passed them. They will then move down by the track used by the mule battery, and will make their way to the top of the pass, where they will receive orders from Colonel Buchanan.

The 9th Foot will move up the pass road in rear of Colonel Doran's Brigade, but in front of the baggage, and will await Colonel Buchanan's orders at the top of the pass.

A party consisting of a company of 9th, two companies 27th, fifty men of 22nd, and one company of 20th, to hold the ridge closing the top of the pass. They will remain there under command of Lieutenant-Colonol Gordon, 20th Panjab Native Infantry, during the stay of the force at Pastaoni.

The Left Brigade, under Colonel Doran, C. B., will be responsible for the occupation of the hill to the left of the pass during the advance of the baggage, and will furnish the rear-guard.

On arrival at the top of the pass, the Left Brigade, on receipt of orders from the Brigadier-General will occupy the village of Pastaoni, under cover of the mule guns.

The 9th Foot and 14th Sikhs, under Colonel Buchanan, will then advance towards the village of Walai, under orders to be given to-morrow by the Brigadier-General.

For favor of insertion in Field Force orders.

J. M. TROTTER, *Captain,*
Deputy Asst. Quarter-Master-General, Field Force

A n n e x u r e H.

*Detail of the Force ordered to march on Pastaoni on the 31st December 1877,
with the distribution of Baggage Animals to the several Corps.*

No. 1, or COLONEL DORAN'S BRIGADE.

Detail.	Europeans.	Native Soldiers and Public establishment.	Followers.	Horses.
2-9th Regiment ...	104	56	...	..
4th Battalion, Rifle Brigade ...	138	43	19	1
27th Punjab Native Infantry ...	9	484	38	7
17th Bengal Cavalry ...	...	20	...	...
Hazara Mountain Battery ...	3	266	8	3
Sappers and Miners ...	10	160	15	...
Strength of Brigade ...	264	1,029	80	11

Memorandum of Mules Supplied.

Sappers and Miners ...	...	...	...	109	mules.
2-9th Regiment ...	...	...	...	23	"
Rifle Brigade ...	...	...	...	38	"
27th Punjab Native Infantry ...	...	...	...	102	"
Hazara Mountain Battery ...	...	...	...	10	"
Staff Officers, Royal Artillery ...	...	...	...	1	"
Commissariat stores, with wood stock for three day's rations	97				"
Bhoosa and Barley for mules ...	...	...	...	36	"
Spare ...	...	...	..	5	"
Total	...	421			"

No. 2, or COLONEL BUCHANAN'S BRIGADE.

Detail.	Europeans.	Native Soldiers and Public establishment.	Followers.	Horses.
2-9th Regiment ...	318	139	..	..
14th Sikhs ...	5	489	9	1
20th Punjab Native Infantry ...	8	369	24	1
22nd " " " ...	1	50	...	...
Staff ...	17	.....	30	17
Strength of Brigade ...	349	1,047	63	19

Memorandum of mules supplied.

2-9th Regiment	...	...	...	...	76 mules.
14th Sikhs	...	...	...	...	92 "
20th Punjab Native Infantry	...	...	...	...	97 "
22 " "	...	...	...	...	18 "
Staff	...	...	...	...	14 "
Survey and Signallers	...	...	...	...	4 "
Executive Engineer	...	...	...	...	1 "
Deputy Commissioner	...	...	...	...	2 "
Commissariat stores with three days' provisions, wood, &c. ; bhoosa, barley, &c.	...	...	...	...	164 "
Spare	...	...	...	...	5 "
				Total	... 473 "

A n n e x u r e I.*Distribution Statement of Baggage Animals on the 15th January 1878.*

Detail.	Mules.	REMARKS.
Hazara Mountain Battery	70	
9th Regiment	125	
Rifle Brigade	60	
Sappers and Miners	84	
14th Sikhs	102	
20th Punjab Native Infantry	101	
22nd " " "	9	
27th " " "	103	
Signallers	3	
Survey	3	
General and Aide-de-Camp	7	
Head-Quarters	6	
Staff, Royal Artillery	2	
Rum	4	
Native provisions	16	
Beef	22	
Water	50	
Fodder	359	
Spare mules	13	
Total ...	1,139 mules.	Of these, 383 were the property of Government, the remainder being supplied by con- tractors.

J. M. TROTTER, *Captain,*
Deputy Assistant Quarter-Master-General.

II.

P E R S I A

ITS POLITICAL PAST, PRESENT, AND FUTURE.

By Major St. John, R. E.

When the Council of the Institution were good enough last year to ask me to read a paper on the physical geography and people of Persia, I purposely omitted to touch on politics ; partly as being foreign to the subject, but mainly because to have done so would have opened up too wide a field to be covered at the fag end of a lecture. The Council have now been kind enough to give me an opportunity of completing my subject by placing before you a summary view of the position that is held by the modern kingdom of Persia in the arena of politics.

Hardly a nation on earth has so far-extending a history as the country we call *Persia*. Its first national sovereign liberated the Jews from their long captivity in Babylon more than 2400 years ago ; and the wars of his successors with the Greeks formed the theme of the earliest of profane historians. The wealth, luxury, and magnificence of the monarchs of ancient Persia have ever since been proverbial ; and to this illustrious past we owe, no doubt, the false estimate often formed of modern Persia by writers of the present day. On the one hand its sovereigns are looked on as the legitimate successors of Darius and Xerxes ; and on the other those who have seen or read that the country is poor, arid, and sparsely populated, contrast its present condition with its semi-legendary history, and jump at once to the conclusion that its climate must have changed, that its people are degenerate, and its national life decaying. The fact is that the modern kingdom of Persia bears precisely the same relation to the empires of the Achœmenidae and the Sassanians that the modern kingdom of Italy does to Imperial Rome ; and there is no more reason for reproaching the Persians with decay and decrepitude than there is for blaming the Italians for not being the masters of the world. Indeed it is not so many years since it was assumed almost as an axiom that the Italian nation was politically defunct, and only fit to be governed by Austrian bayonets.

It is perhaps unnecessary for me to remind you that the name—*Persia*—as applied to the Iranian monarchy, is of foreign origin, and has never, at any time been used by the people themselves. It is of course derived from the province now called Fârs, into which, its Arab conquerors, having no *f* in their alphabet, changed its early name of *Páris*, or *Párs*. Similarly, the city we still call Ispâhán, is always written and pronounced by educated Persians, *Isfáhán* ; *Píl*, an elephant has become *Fíl*, and so on. The province of Fârs proper, the ancient Persia, is the smallest of the three that at a very early period were occupied by kindred Aryan tribes, supposed to have emigrated from the neighbourhood of the Hindoo Koosh. The other two were Media, which comprised the modern Irak and Azarbaijan ; and Parthia, the present

Khurasan. All three in turn have held the supreme power at different periods of Persian history. The Medes were the first of the Aryan nations to throw off the yoke of the Semitic Assyrians, but their tenure of power was brief. They were conquered in their turn by the more warlike Persians, who founded the magnificent Empire that extended from the Mediterranean to the Indus, and lasted for 227 years from its establishment by Cyrus, till its destruction by Alexander. After the brief interval of Greek domination following his death, Persia and Media became provinces of the Parthian, or Arsacidan monarchy, of which little is known but the successful resistance it opposed to the extension of the Roman arms eastward. The Arsacid Kings appear to have been less emperors than chiefs of a confederacy of both Aryan and Turanian tribes, the latter being probably in the ascendant, for in 228 A. D. Ardashir, a native of the country near Shiraz in Fars, rebelled, threw off the Parthian yoke, and restored the kingdom of Persia to almost its former glory. His dynasty, named the Sassanian, reigned for over four centuries, its dominions comprising, beside the modern kingdom of Persia, Turkistan as far as the Oxus, Armenia, and Mesopotamia. In the year 636 A. D. the Sassanian empire, and with it the ancient Zoroastrian faith, fell before the advancing tide of Islam on the field of Kaddinyah. Yazdegird, the last Sassanian king, left a daughter, who married Hasan, grandson of the Prophet Muhammad, and third of the Shiah Imams, an event which had a considerable influence on the subsequent history of Persia.

For 850 years after the Moslem conquest, Persia can hardly be said to have had a separate political existence. At first it was a mere province of the Khalifat; then for a short time independent under native chiefs; and latterly ruled, like all Western Asia at that time, by Turks, or Mongols: but on Arab and Türk alike contact with Iran had a civilizing influence; many of the most famous names in Arabic literature and science were those of native Persians; and the period of Türk rule was the golden age of Persian literature, of Firdausi, of Saadi, and of Hafizh.

By the commencement of the 15th century Iran had become so far mongolized as to count perhaps one-third of her inhabitants of pure Turanian blood. In northern Media, or Azarbajian, the Aryan element had long disappeared. Susiana, originally a Scythic province, had on the other hand become Aryanized; but the wide plains and grassy valleys all over Persia except the extreme south-east were, as they still are, occupied by hordes of Türk nomads, descendants of the followers of Jenghis and Taimur. Of the manners and customs of this strange people I gave an account in a former lecture. I will therefore, only mention that with a considerable tincture of Persian civilization, they retain to the full their nomad habits, marrying only among themselves though giving their daughters to influential townspeople, rarely entering a house, disdaining to guard the virtue of their women with thick veils and harem restrictions, by no means particular as to religious obser-

vances, always ready for fighting, and when displeased with the Government taking to highway robbery as the natural and legitimate means of showing their displeasure.

After the invasion of Taimur, seven of these Turkish tribes, who had resisted him, were transported to Syria ; but at the intercession of a holy recluse, named Safi-ud-din, were permitted to return to Persia. Safi-ud-din was descended from Hasan, grandson of the prophet, who, as I have mentioned, married a daughter of the last Sasanian king. His family had thus a double claim to the veneration of Persians ; and when Ismail, great-great-grandson of Safi-ud-din, raised the standard of revolt against the Turkish sovereigns, he was joined by all the Aryan people, as well as by the seven grateful Turkish tribes. He soon became independent, and to consolidate his empire, and give a bond of union between its warring elements of Persian, Turk, and Arab, he proclaimed the Shiah religion to be the state religion of the country. On the differences between the Sunni and Shiah faiths it is unnecessary to enter here, or to argue which is the better, but there can be no doubt that the less rigidly monotheistic and ceremonial tenets of the Shiah sect are more suited to the impressionable character and lively imagination of the Irani, than the stern and colourless creed of the Arab, adopted without difficulty by the Turk, who is satisfied with any religion as long as it supplies him with a respectable fetish, and does not give him the trouble of thinking. The Turks of Persia are quite as bigotted Shiah as their kinsmen in Turkey and Central Asia are Sunnis. With Shah Ismail, the first Sufi, or Safavi King, and his establishment of Shiahism as the national religion, begins the history of the modern kingdom of Persia, and it may be doubted whether any thing else would have preserved it almost undivided to the present day.

The Safavi empire, after 150 years of power, began to wane. The fatal influence of Zanana life on manly education, and the growing strength and turbulence of the seven Turk tribes diminished the power of the central government, till, two centuries after its foundation, the empire of Ismail fell before the Afghans. Their attack on Persia was however little more than a raid. After capturing Ispahan in 1722, and committing all sorts of atrocities, they were checked before Shiraz, and finally driven out of the country by Nadir. On the career of this great warrior, who was a Turk of the Afshar tribe, it is needless to dwell. During his life he was supreme from the Ganges to the Tigris. On his death Persia again became a prey to discord. Ahmad Shah, Abdali, an Afghan chief, seized the Eastern half of Nadir's empire, and founded the Durani Monarchy, which came to an end with our unfortunate protégé, Shah Shuja, in the Afghan war of 1841-2 ; leaving a legacy of trouble to India in the heritage of his rival and successor, Dost Muhammad. Persia proper was for many years divided among different chiefs. The main struggle lay between the Zands of Fars, a semi-nomad tribe, claiming descent from the Pasargardae, the old royal clan, and the Kajars of the Caspian coast,

one of the seven Túrk tribes. At last the Zands, under the command of their chief, Karim Khan, succeeded in establishing their rule over all Persia except Georgia and Khurasan ; and there appeared a chance of a return of the wide and beneficent sway of the Sassanians under a genuine Irani dynasty. But the Túrk element in the North was too strong. After the death of Karim Khan, whose memory is still cherished among Persians of all classes, Túrk and Tajik alike, as the most just and generous of rulers, the Kajars gained undisturbed possession of the throne. The present Shah is the fourth sovereign of this line. The first was the able, but cruel eunuch, Agha Muhamad. The second was his nephew, Fathi Ali Shah, who reigned from 1797 to 1834. He was succeeded by his grandson Muhamad Shah, who died in 1848, and was succeeded by his son, the present Shah, Nasr-ud-din, who is now about 48 years of age.

The foregoing hasty summary of Persian history will perhaps have made clear to you what is I thiuk the main lesson to be derived from it. When its rulers were either pure Aryans, as the Achæmenidae, and the Sassanians, or semi-Aryan, and content to govern in a purely national manner as the Safavi kings, the country not only reached a high degree of internal prosperity, but imposed its dominion on its neighbours. The long duration of these three dynasties is especially remarkable when contrasted with the Turanian Governments, which never lasted above two or three generations, and were always weak against foreign foes. The reason is, I believe, the absolute incapacity of the Túrk for civil administration ; and to this cause is attributable much of the weakness of Persia at the present day. The first two Kajar sovereigns, Túrks though they were, had been brought up amid Aryan Persians, and in their time all high offices of state were filled by them. But the present Shah and his predecessor were appointed, as mere children, nominal Governors of Azarbáijan, a purely Túrk province. In consequence Túrki has becoms the language of the court ; and all places of trust and importance, both in the capital and the provinces, are filled by Túrks, brave no doubt, but greedy and incapable. Thus, although Persia is to outward appearance stronger than she was at the beginning of the century, having reduced Khúrasán to obedience, and regained her hold on Balúchistán and the gulf ports, chronic misgovernment has done much to check the growth of the internal prosperity, which might have been expected from so long a continuance of peace.

The next point that invites attention is the relations of Persia with her three powerful neighbours, Turkey, Russia and England, for our maritime hold on the Persian Gulf makes us practically her neighbour, though our territories are nowhere contiguous.

We will begin with Turkey, the natural ally it would seem of Persia, the two being the chief Muhamadan powers, being governed by dynasties of kindred blood and tongue, and having the same implacable foe to dread. But the relations of Sháh and Súltán have always been

the reverse of cordial. In fact, up to 1829 whenever there was not actual war between the two countries, their common frontier was in a constant state of ferment. In 1604 Shah Abbas the great took Bagh-dad, and with it the two places of Shiah pilgrimage, Kerbela and Najaf. Thirty years later they were retaken, and have ever since remained in the hands of the Turks. Nowhere are the evils of Turkish rule more patent than in these Mesopotamian provinces, though the population is almost uniformly Muhamadan. With the exception of the vicinity of Basra, these fertile plains, once the garden of the world, are now little better than desert. What little prosperity Bagh-dad now has is mainly due to its being the commercial mart of Western Persia, and to the Persian pilgrims who flock to the tombs of Ali and Hussain. The harsh manner in which these, as well as those who go to Mecca, are treated, the exactions to which they are subjected, and the necessity of concealing their Shiah tenets while in Arabia, not unnaturally keep alive a spirit of illwill and illfeeling towards the Sultan's Government in the breasts of all Persians, Turk and Tajik alike. In 1849-53 an Anglo-Russian commission met to survey and report on the long line of the Turko-Persian frontier from Mount Ararat to the Gulf. Their map was completed a few years ago, but agreement has been found impossible. In my opinion Persia could hardly have been blamed if she had taken part with Russia against Turkey in the late war, though she might probably have had to share the fate of Roumania, and give up some province she does want in exchange for one she does not. But to have taken part with Turkey against Russia, as she was reproached by some ardent Turkophils for not doing, would have been madness. The alliance of Persia and Turkey would no doubt have materially altered the conditions on the Asiatic field of war, and would have preserved Erzeroum at least, if not Kars; but it would not have affected the main issue in Roumelia, and would probably have lost the Shah the south bank of the Araxes, if not that of the Atrak as well. For Turkey, and perhaps it might be argued for England, it would no doubt have been better had the Shah joined the Sultan; for the interests of Persia it was better to remain neutral as he did. It would even seem that he has managed while Russia had her hands full elsewhere, to possess himself of Marv, a solid advantage, to the importance of which I will return hereafter.

The story of the relations of Persia with her great northern neighbour are equally instructive and amusing. The first that we hear of them is from *Chardin*, who about the year 1,664 was present at an interview accorded to two men, who brought letters from the Czar of Muscovy to Shah Abbas the second. They had with them 800 followers, and were at first courteously received, and lodged in a royal palace, which they defiled by their disgustingly dirty habits. It was later on discovered that their main object was to smuggle merchandise into the country, and they were dismissed with contempt.

In 1721 the scene changes. Peter the Great had raised Russia to a place in the first rank of European nations, and we find the Safavi

Shah imploring his help against the Afghans. This was characteristically afforded by the Russian occupation of the Caspian provinces of Shirwán and Gilán ; and the following year Peter concluded a treaty with the Shah by which the latter agreed to cede the remainder of his Caspian provinces in consideration of the Afghans being expelled. But this condition was never fulfilled, or even attempted, though the Russians held Gilán for some fifteen years, when the unhealthiness of the climate forced them to retreat. In 1,746 the Russian Government prohibited English trade on the Caspian, which Peter had encouraged.

For some time after this the Russians seem to have let Persia alone; but in 1781 an officer named Voinovitch requested the permission of Agha Muhamad Khan Kajar, who then held Mazandaran only, to build a store-house on the coast near Astrabad. The store-house naturally turned out to be a fort with 18 guns, and a garrison of 500 men. The wily Kajar Chief, knowing the impossibility of turning out the Russians by force, employed an artifice so simple as to make us wonder at such cunning gentry being deceived by it. He paid a visit to the fort, admired the guns, and praised the soldiers, and on leaving invited Voinovitch and his officers to pay him a return visit at his camp at the foot of the mountains, in the midst of the forests and morasses of Mazandaran. The Russians accepted the invitation, but on their arrival were at once put in irons, and informed by the Kajar Chief, that though their guns and soldiers were no doubt very formidable on the seacoast, they could do him no harm in his mountains and jungles; and declared that if immediate orders were not sent to destroy the fort and reship the guns, they should all be put to death. Voinovitch, seeing that he was caught, gave the required order, and was released with contempt and abuse.

Some few years before this the Russians had taken advantage of the civil war going on in Persia to establish themselves firmly south of Caucasus. Heraclius, Christian Prince of Georgia, who had been little more than nominally dependent on the Persian Shahs, had been induced to place himself under their protection. When Agha Muhamad Khan Kajar obtained undisputed possession of the throne he invaded Georgia, defeated and slew Heraclius, whom the Russians made no attempt to save. The next year however a Russian force invaded Georgia, but was recalled on the death of Catherine by her successor Paul. But in 1802 the Russians returned to the attack, and in the course of four years subdued all the northern Caucasus provinces and overran Georgia. In 1804 they defeated the Persians near Eriwan, but in the following season met with a severe check in Gilan. The war lingered on for several years; and aid to Persia against Russia was one of the objects of Sir John Malcolm's missions in 1800, and 1809, and of the loan of English officers to the Shah. Among the latter were Captain Christie of the Bengal Infantry, and Lieutenant Lindsay of the Madras Artillery. In 1812, England and Russia being at peace in Europe, the English Officers in the Shah's service were ordered by the British Minister at Tehran to

withdraw. All obeyed but Christie and Lindsay, who refused to leave their men, and took part in the disastrous campaign that ensued. After defeating the Persian army on the Araxes, the Russians attacked them in their halting place at night. Lindsay managed to save two out of his nine guns, but Christie fell at the head of his brigade while covering the retreat; and, lying wounded on the ground, was deliberately cut to pieces by order of a Russian officer.

By the efforts of England a peace was patched up in 1813, confirming all, or nearly their conquests to the Russians, and excluding Persian ships of war from the Caspian. This is known as the peace of Gulistan. It left some of her possessions in the Caucasus to Persia, and in 1826 Russia, fearing to wound English susceptibilities by open attack, succeeded by an ingenious system of aggravation, culminating in actual invasion, in forcing Persia to declare war. After a campaign lasting two years, the Shah was forced to sue for peace, and signed the treaty of Turkomanchai, surrendering all his possessions North of the Araxes, and leaving the frontier as it now stands. Since the conclusion of the treaty of Turkomanchai, now 50 years ago, Persia and Russia have been at peace. The most notable incidents during that period have been the open assistance rendered to the Persians at the siege of Herât by the Russian Minister, Count Simonich; the occupation of the island of Ashurada on the coast of the Caspian under the pretext of putting down the Turkman pirates whom the Persians were unable, according to the provisions of the treaty of Gulistan, to attack by sea; and the creation by ukase of a Russian province east of the Caspian in territory claimed by Persia. Of the influence of Russia on the internal affairs of Persia I will speak further on. The preceding sketch will have sufficed to show that without valid pretext of any kind, Persia was dispossessed of the tributary Christian Province of Georgia, and of the Mahamadan districts east of it. The Christian Princes of the former, who had invited the Russians into the country, speedily found that they had exchanged King Log for King Stork, and lost both reality and semblance of power.

I now come to the relations of our own country with Persia, and though they are unmarked by the flagrant dishonesty and wholesale spoliation which distinguish those of Russia, they are hardly such as to give us reason to boast. They date from very early times, and were much more creditable in their early than their latter phases. Towards the end of the sixteenth century Queen Elizabeth sent Sir Anthony Jenkinson on an embassy to Shah Abbas the Great. A few years afterwards the two brothers Shirley, Sir Anthony and Sir Robert, the last of the knight-errants, made their appearance at the court of the Shah, in whose service Sir Robert remained for thirty years, and was more than once employed on embassies to the Great Powers of Europe. He is said to have introduced the use of firearms into Persia. But Persian relations with England and India first became interesting in 1799, when Sir John, then Captain, Malcolm, was sent to the Court of Tehran by the Marquis of Wellesley. At that time our Government was apprehensive

of the success of Napoleon Bonaparte's wild schemes of eastern conquest, and the Afghans were supposed to be meditating a renewal of the raids of their ancestors on Upper India. Malcolm was therefore instructed to conclude a treaty against France, and to bribe the Shah to attack Herat as a diversion to prevent the dreaded Afghan invasion. But before he reached the Persian capital all fear of the latter had ceased, and the treaty concluded had mainly reference to the French, whom the Shah promised to extirpate should they venture to set foot in his dominions. This was very satisfactory, but when the Shah in 1806 begged in return the aid of England against *his* enemies the Russians, it was refused for the very sufficient reason that we were then engaged side by side with Russia in fighting Napoleon, to whom the Shah, repulsed by England naturally turned for assistance. Unluckily the peace of Tilsit between France and Russia was concluded almost simultaneously with the despatch of a French mission under General Gardanne to Tehran. This alarmed the English and Indian Governments; and in 1809-10 the rival embassies of Sir Harford Jones and Sir John Malcolm were sent to Persia. On the somewhat comic story of their squabbles it is not worth while to dwell, nor to recount the separate clauses of the treaties they negotiated on behalf of the King of England and the East India Company. The French were, however, promptly dismissed; and English officers lent to drill the Persian troops and lead them against the Russians. But in 1812, not two years later, the cards in Europe had been shuffled; England and Russia were again firm allies; the English officers were ordered to withdraw; and the unlucky Persians left to be defeated, and to submit to any terms our Russian ally chose to impose. The result was the treaty of Gulistan, which left the door open for further aggression and made the Caspian a Russian lake. But as soon as its terms were known in England, the Government felt conscience-stricken, or perhaps only uneasy: and sent out an Ambassador to conclude a new treaty with Persia of which the most important clauses run as follows:—

"ARTICLE IV. That aid in troops or a subsidy of £100,000 sterling shall be given by England to Persia, in case of invasion, provided Persia is not the aggressor.

ARTICLE VI. Should any European power, when at peace with England, make war on Persia, England is still bound to assist Persia by troops, or with a subsidy.

ARTICLE IX. If there is war between Persia and the Afghans, England will not interfere unless her mediation is solicited."

These clauses have not had an altogether salutary effect on Persian politics.

From 1814, when this treaty was signed, till 1826, English interest in Persia gradually waned; the Russians, by making war without declaring it, tempted the Persians to attack them; and thus offered England a pretext for evading the promises contained in the two first of the

clauses I have just read. There could be no doubt that Russia was the real aggressor, but advantage was taken of the wording of the treaty to refuse the assistance promised to Persia. She was thus forced to conclude the peace of Turkomanchay; and England took the opportunity to purchase exemption from the two clauses of the treaty which she felt to be embarrassing to her policy and her conscience, by the payment of 200,000 tomans, (about ten lakhs of rupees) towards providing the indemnity demanded by Russia. This course was perhaps justifiable, especially from the point of view of British interests. But you will hardly be surprised to hear that the Persians did not think it so. English influence up to this time had been paramount at Tehran, but after the cancelling of the treaty had been thus purchased, Persia imagined she had nothing more to hope from England, and threw herself into the arms of Russia. The result was the siege of Herat, attempted in 1833, and carried into effect in 1839 under Russian auspices. The story of this famous siege is most interesting; but time forbids my dwelling on it. Suffice it to say that it lasted for nine months, and was directed in its later phases by a Russian General, aided by Russian and Polish officers, and by a corps of so called Russian deserters. The protracted defence was mainly due to the gallantry and skill of Lieutenant Eldred Pottinger, of the Bombay Artillery. The British Minister, Sir John McNeill, finding his remonstrances unheeded, hauled down his flag; a small force was landed at Kharak, an island near Bushire; and Colonel Stoddart (afterwards basely murdered in Bukhara) was sent to the Shah's Camp to tell him that England would declare war if the siege were not immediately raised. This threat had the desired effect, and Herat was saved.

Russian influence was thus for the time checked, but she soon afterwards was allowed to occupy Ashurada, and she continued to keep in her pay, and in power, the prime minister, Hajji Mirza Aghassi, who let the country fall into an almost unprecedented state of anarchy and misrule. On the accession of the present Shah, in 1849 matters were somewhat mended, and in 1853 he entered into a formal agreement to abstain from attacks on Herat.

During the Crimean war the conduct of Persia was vacillating. At first she was near joining Russia, but afterwards would have allied herself with England and France, had not they, unwilling to have another sick man on their hands, declined the alliance. On this the Persians supposing England to have her hands full in Europe, thought the opportunity favourable for gratifying their aspirations towards Herat; and in April 1856 the city was besieged. In October, having no Pottinger to conduct the defence, it fell. England declared war against the Shah in November, and an army previously made ready in Bombay, was sent at once against the ports of the Gulf. The British force numbered 11,600 men, including 2000 cavalry. Bushire fell almost without resistance; and the Shah at once sent orders to his ambassador in Paris to conclude peace on any terms. The subsequent advance to Borasjun, and the capture of Muhamrah, an operation skil-

fully planned and executed, had therefore no bearing on the political situation. Herat was abandoned, and a few years afterwards fell into the hands of the Amir of Kabul, a circumstance which did not increase the affection of Persia for England.

The Persian war terminated you will remember only two months before the mutiny, and I was once told on good authority that it was known to the Persian Government that disturbances of some sort would break out in India in 1857; but that the intended combination failed owing to the want of skill shown by the Persian Prime Minister in the diplomatic discussion before the war, and the hurried conclusion of peace after the fall of Bushire. Muhamrah was not taken till March 1857, and the British force could have done little or nothing more without a baggage train, which it utterly lacked. An advance into the mountains behind which lies Persia proper, was quite beyond the powers of the British general with the means at his disposal. At the most he could have occupied Dizful and Shustar, cities in the plain within reach of Muhamrah, before the outbreak of the mutiny would have necessitated the recall of the expedition. Thus the Persians would have had a couple of years at least in undisturbed possession of Herat; and we might have thus paused before undertaking a fresh war to turn them out. This was my informant's view, a sufficiently plausible one, but on the other hand it might be argued that the retention of Bushire, even during the mutiny, would have been easy, and would have proved so annoying to Persia as to force her to abandon her conquest.

Now that we are on the subject of Herat, it may be well to explain the motives which may be supposed to actuate Persia in her repeated attempts to possess herself of it; for it appears to me that English writers have been too much in the habit of taking it for granted that they were uncalled for aggressions, prompted only by reckless ambition, and the insidious wiles of the Russian wirepuller, intent on his own evil designs against India. In the first place Herat is far more Irani than Pathan. It formed as much a part of Persia up to the death of Nadir as did Mashad or Karman. It is geographically in Persia, from which its recent severance, recent that is to say in comparison with the antiquity of its history, has been equally disastrous to its own interests and those of its ancient mother country, without doing any particular service to its Afghan masters. This is due to its strategical position with reference to Mashad and Marv. All three are strong positions, and form a triangle with sides from 150 to 200 miles in length. That between Mashad and Marv is the shortest, and is broken by a track of desert 50 miles wide. The other two sides pass through a country uniformly fertile and well-watered. From the Black Sea to China stretches a vast chain of mountains, shutting off the rich countries of southern Asia from the arid deserts of the north. At one point they sink into comparative insignificance, and this gap is guarded by the trilateral, Herat, Mashad, Marv. From the earliest times these three cities have formed the bulwark of Iran against Turan, of civilization against barbarism. Only great conquerors such as Jangis and Taimur

were able to pass then, and not it will be admitted for the benefit of mankind." As long as the fortresses at the base, Mashad and Herat, remained in the same hands, they were able to hold Marv as a common outwork; and it continued to be a flourishing commercial centre, to keep the Turkman savages of the Kharismian desert in check, and to protect the fertile lands within and beyond the triangle. After Nadir's death Mashad and Herat were divided, the former remaining to Persia, the latter forming part of the Durani Empire founded by Ahmad Shah. The consequence was that Marv was soon abandoned by its peaceful inhabitants, and fell into decay; while in the country between it and Herat and the latter and Mashad, little more than ruins remain to attest its former prosperity. By the gate thus opened the Turkmans carried their raids far into the heart of Persia, and the ruler of Herat, for many years before and after its first siege, was a bloodthirsty tyrant whose cruelties disgusted Pottinger, and who carried on a lucrative traffic by abetting the Turkmans in manstealing, even selling his own shiah subjects into slavery.

Now, though I have no wish to contest the right and justice of England preventing the Persians from retaining Herat, I think you will agree with me that there is something to be said from their side of the question, and that they are not unreasonable in considering their motives for wanting Herat more powerful than ours for keeping them out of it. Recent events have indeed somewhat strengthened their view of the matter, for it must be admitted that were Herat at the present time a Persian instead of an Afghan town we should not now be contemptuously excluded from entering it.

The position of political parties is the next point to which I will invite your attention, but it will not take long. For indeed among the people themselves there are no political parties at all, except that the Turks despise and bully the Tajiks, whenever they get a chance, and are repaid by dislike often extended to the King and his very numerous relations. It is perhaps worth mentioning that Fathi Ali Shah is said to have left 3000 descendants alive at his death, a royal family which is found very expensive to the country. Among those interested in the Government, there are three parties. The first, and certainly until latterly the most powerful, is the conservative or clerical party, consisting of the bigotted priesthood, the majority of the royal tribe, and a large proportion of the officials, in fact of all who hate change and love bribery and corruption. Until the last few years this party has almost invariably held the reins of power, being favoured by the mob, the priests, and the Russians. Recently it has been ousted by the radical, or young Tehran party, headed by the present Prime Minister, Mirza Husain Khan, who possibly some here may remember as Consul-General of Persia in Bombay. This is the party that favoured Baron Reuter and his schemes, and wished to bring Persia into the first rank of European civilization by a coup-de-main. With the exception of the minister and his brother, who is the Shah's closest friend and head of his household, and their

dependents, this party counts few adherents beyond the small number of young Persians educated in Europe. The third party, though weak in the capital, is perhaps the most powerful in the provinces. It is headed among other nobles by the Shah's uncles, Sultan Murad Mirza, the general who took Herat, and Farhad Mirza, who was regent during his nephew's absence in Europe. These two are probably the most able and enlightened rulers in the country. They oppose the conservatives as reactionary and Russian; would welcome a close alliance with England while deprecating foreign interference; and seek to improve the country by securing good internal Government before forcing on it foreign institutions for which it is not ripe.

The comparative influence of England and Russia at the court of Tehran is a point of much dispute, often confounded with the influence they possess in the country, a very different matter. With regard to this it may be said that Russia is supreme in the North, but not so entirely so as England is in the South. About the Northern Frontier and the Caspian, the foreign traveller is asked—are you a Russian—; in the South it is—are you a Frank—*i. e.* a European; while in the Central Provinces it is—are you a Russian or a European—a distinction too often forgotten in more civilized lands. To the Northern Persian Nijui Novgorod is the centre of the commercial world, while the Shirazi or Karmani merchant looks on Bombay as supreme. At the court and among the higher classes Russia is as a rule feared and disliked, England feared, though in a less degree, and respected for everything but her policy towards Persia. Russia is looked on as the enemy which has already absorbed some of the fairest provinces of Persia, and is ever on the lookout for opportunities of further spoliation. Her interference in the internal Government is believed, and perhaps with reason, to be used for the support of corrupt and incapable ministers with the express purpose of weakening the country. She offers persistent opposition to all projects of improvement, except those that tend to strengthen her military position towards Persia, and favour her commerce. But the vicinity of Tehran to the Caucasus and the Caspian brings Russian power ever before the eyes of the Shah and his court, while the Persian gulf, where England is equally supreme, is far off, rarely visited by any man of rank, and has never been seen by the Shah himself. Were the capital of Persia at Shiraz, or even at Isfahan the influence of Russia at the court would be far less than it is.

I have already related how the English Government twice, (in 1813, and again in 1826,) failed to keep its promises of assistance to Persia against Russia. The recollection of this, the belief that the repression of the Turkman raids was only prevented by England's persistent refusal to allow Persia to hold Herat, as well as one or two minor matters such as the stoppage of the import of negro slaves, and the Sistan arbitration, keep alive a strong and not altogether unfounded feeling of resentment against England even among those Persians who are the bitterest enemies of Russia. But they believe that the latter power is

only kept from absorbing their northern provinces by fear of England, and they have a sincere respect, even perhaps an affection for Englishmen personally. The measure of the influence of the two countries may be gauged, and the common impression that Russia is absolutely paramount be rebutted, by the simple facts that the Russians unsuccessfully opposed the construction of the Anglo-Persian telegraph, and that, more than one unsuccessful request has been made by the Shah of late years for English officers to drill his troops, he has never asked for Russians.

The antagonistic interests of England and Russia, commercial and political, have been a source of real evil to Persia. Every scheme for improved communications, the great want of the country, proposed by one, would necessarily act to the disadvantage of the other. If the navigation of the Karun were opened, and a carriage road made to Ispahan from Shustar, as was proposed some two or three years ago, Russian hardware and piecegoods would be driven out of Central Persia. On the other hand, if the projected railway from Tiflis to Tehran were constructed, our Persian gulf trade would be well nigh ruined. The Russians have been entirely successful in preventing any amelioration of the communications in the south, while they have managed to do a little for themselves in the way of improving roads in the north. But on the whole next to nothing has been done, and for this the Persians are hardly to be blamed. The next time anything like the Tiflis-Tehran railway is proposed, it would perhaps be better, instead of throwing cold water on the scheme, to take the opportunity of obtaining corresponding concessions regarding the improvement of communications in the south. At least it is hardly fair to reproach Persia with decay and backwardness while it is only the mutual jealousy of England and Russia which prevents her trying to help herself. At present she is somewhat in the position of the fabled coffin of the Prophet Muhamad, poised between the opposite poles of English and Russian civilization.

So much for the past and present of Persia. The points remaining for consideration are—her intrinsic value as a factor in the Eastern question in its various ramifications—and the side she may be likely to take in its settlement. In other words—are her friendship and alliance to be had, and are they worth having? Here again we must distinguish between the country and its rulers. For however weak and vacillating the Government may be, this does not affect the geographical position of the country, which is in fact a vast fortress, penetrable by armies at comparatively few points. The Tigris valley, down which Russia hopes to force her political and commercial despotism to the Indian Ocean, is flanked from the table-land of Armenia to the gulf by the impregnable mountains of Persia. Without the co-operation of Persia, an invasion of India through Afghanistan, the cherished dream of Russian soldiers, the nightmare of English Russophobes, would be impossible. Every project for connecting the Railway systems of Europe and India, excepting always the

wild scheme of M. De Lesscgs, places the longest section of its line in Persia. These considerations, putting aside our commercial interests in the country, which are by no means small, for she not only is a large consumer of English goods, but passes on a considerable amount to Central Asia, are sufficient to place her quite out of the category of cyphers, as far as the Eastern question is concerned. It has also been held by some writers that Persia could be used as a base for the attack of the Caucasus and the recent acquisitions of Russia in Central Asia. With this I cannot agree. On the map before you I have drawn, I believe correctly, all roads into and in Persia, traversable by modern armies, not expeditions equipped for mountain warfare, but one or more corps d'armee fit to take the field against the garrison of the Caucasus. To the best of my belief not a single route into the interior of the country from the coast on the whole long line between Gwadar and Muhamrah is so traversable, at least at a reasonable cost of time and money, either on account of the difficulty of the roads, or the poverty of the country. With Turkey and Persia in alliance against Russia, it might be possible to concentrate a large force in Azarbaijan; but not for many months after the declaration of war, by which time the Russians would be meeting us halfway. Since the treaty of Turkomanchai Persia has been perfectly defenceless on the side of the Caucasus. The fortresses which delayed Russia in previous campaigns are now in her hands, together with a fortified passage across the Araxes, which forms the frontier. Moreover the country which thus lies open to attack is rich, and easy; and is besides the native province of the Shah and his principal people, who think more of this Azarbaijan and the Caspian Provinces, which lie almost equally open, than of all the rest of Persia together.

As long it remained a simple question of neutrality, or of preventing interference with our protege's, the Afghans and Baluchis, our maritime hold on the gulf is a lever strong enough, to keep the Shah in order. But if it came to a question of life and death of joining one side or the other, whether he liked it or no, I believe that the consideration just mentioned, and the recollection of England's former promises made only to be evaded, would in the present condition of affairs, determine him to join the Russians in preference to the English. It would be, I have still less doubt, against the wishes of the majority of his people; and the occupation of the Southern provinces of Persia, which a Russo-Persian alliance would almost force on us, would, I feel equally sure, meet with no opposition from the inhabitants. This the Russians know, and the only case in which they would be wise in seeking an active alliance with Persia, would be the very improbable one of an attempt at an invasion of India, to which, as I have said the co-operation of Persia would be indispensable, and which could not be disturbed by flank movements from the Gulf. In the far more probable event of a movement down the valley of the Tigris, Persia's neutrality would be more valuable to a Russian commander than her active alliance. A neutral would protect his left flank

as effectually as an ally, and would keep the English out of Khuzistan the best base of operations against him. In this case the value of a Persian alliance would be so great, and the danger of her neutrality so compromising, as to justify our forcing her to declare herself for one side or the other. If she joined us, the occupation of the Zagros passes by a small British force, forming the nucleus of a Persian army under English officers, would render an advance to Mosul difficult, and to Baghdad impossible; and would probably transfer the seat of war to Armenia and Azarbaijan. But with Persia neutral or on the side of Russia, we could hardly hope to check their advance north of Baghdad, if even there, and might be forced to confine ourselves to the occupation of Khuzistan as a base for closing the navigation of the river and for a subsequent counter attack. The alliance of Persia would thus be of great importance in opposing an invasion of the Tigris valley indeed would probably prevent its being attempted; but though the country as a whole is in our favour, the peculiar position of the ruling caste, makes it more than doubtful whether we could obtain it without a radical change in our recent policy, which may be summarized as that of the candid friend, ever ready with sermons and advice, but bitterly afraid of loosing his purse strings, or of offending the gentleman over the way.

Putting aside the Herat question, which may be considered as settled, I see no reason why the influence of England in Persia should not be largely increased. Apprehension of wounding Russian susceptibilities is not likely for some time to come to stand in the way of the loan of British officers to the Shah; and an army of 1,00,000 Persian soldiers, than whom better material is rare, with their old English traditions revived, and faintly drilled and equipped, would be a new and formidable factor in the Eastern question. Persia is certainly the most civilized, to my mind the most civilizable nation of Western Asia, in some respects, indeed, more civilized than her Northern neighbour. Her people are too intelligent to be driven, they must be led; and to lead them in the ways we wish them to follow, the ways of better Government, and of improved communications, we must be content to lead them at first in their own path, that of increased military efficiency.

Whether the result of the congress now sitting will be peace or war no one can say; but in either case we may look forward with confidence to an increase, unprecedented of late years, to the influence and prestige of England. Should this, as I venture to predict it will, call forth a reiterated request from Persia for British officers to lead her troops, I trust that it will not again be refused; and I can assure those who may, peradventure be called on to serve there, that they will not find the country an unpleasant or unworthy field for their labours.

There is one point on which I have omitted to touch, and which perhaps merits a few words, I mean the designs of Russia on Persian

territory. She is occasionally represented as only waiting her time to annex the whole country, which is supposed to lie at her mercy. It is impossible to exaggerate the hopes and wishes of the thorough Muscovite, who looks upon his nation as destined to become the mistress of the world, but I do not think that any reasonable Russian ever holds such an idea as the conquest of Persia. At great expense, and in the absence of opposition from England, Russia might, no doubt, occupy the principal towns, and even penetrate to the seacoast. But the mountain ranges between the Tigris valley and the plateau cover an area many times larger than the Caucasus, which it took Russia a century to subdue, are as lofty, as difficult of access, and inhabited by races fully as fanatical and warlike. Such a conquest, even if made would be barren; for Persia, particularly the south, is emphatically a poor country, and has only been worth conquering as the seat of conquerors who had made themselves masters of the rich Tigris valley.

As regards the northern provinces of Persia the case is different; and Russia, with varying amounts of reason, has been credited with designs on each and all of them. A high official recently assured Her Majesty's Government, in a despatch which has been published, that a treaty existed between Russia and Persia, for the exchange of Mazandaran and Gilan, (the only part of the Caspian remaining to Persia), against the province of Baghdad. This produced a controversy in the newspapers in which, as usual, both parties were partly right and partly wrong. Mr. Arnold, one of the controversialists, declared that Russia could not want Gilan and Mazandaran, as they nowhere touch Russian territory; but that Azarbaijan was the object of their cupidity. Geographically speaking Gilan does not touch Russia on the west, for the district of Talish, of which half is Persian and half Russian intervenes. Politically, however, it does, as the administrative province of Gilan includes Talish. Conversely on the east Mazandaran geographically extends to the Gurgan, but politically the little province of Astrabad, the heritage of the Kajar tribe, intervenes. But in the main point Mr. Arnold was right, the Caspian Provinces are not coveted by Russia. As a road from the Caucasus to her new province of Transcaspiana they would be useless from the swampy and unhealthy nature of the country. I have already mentioned that Gilan was abandoned on this account after it had been held for fifteen years. Russian officers have told me that the small part of Talish now in their possession, which is similar in climate, has proved a failure. As long as Russia keeps in her own hands the fisheries and carrying trade of the Caspian Provinces she has no need to annex them. With regard to Azarbaijan the case is different. This is a fertile upland country, well watered and rich in minerals; and the map shows that it forms a spur intervening between Turkish and Russian territory. As long as Russia holds the country as far as Ararat only, she has no pressing object in annexing any part of Azarbaijan, which lies wholly at her mercy in a military point of view. But should her encroachments creep southward through Armenia, she will find it necessary to round off her frontier

by including within it the intervening section of Azarbajan, otherwise her military frontier would be weakened. Thus the retention of Bayazid would involve the purchase or seizure of a small bit of Persia south of Ararat, to give free communication with it. Her next step, she probably hopes, will bring her at least to Van, and would be followed by the absorption of the Persian town of Khoi, and its neighbourhood; while a third to Mosul would necessitate the seizure of the rest of Azarbajan.

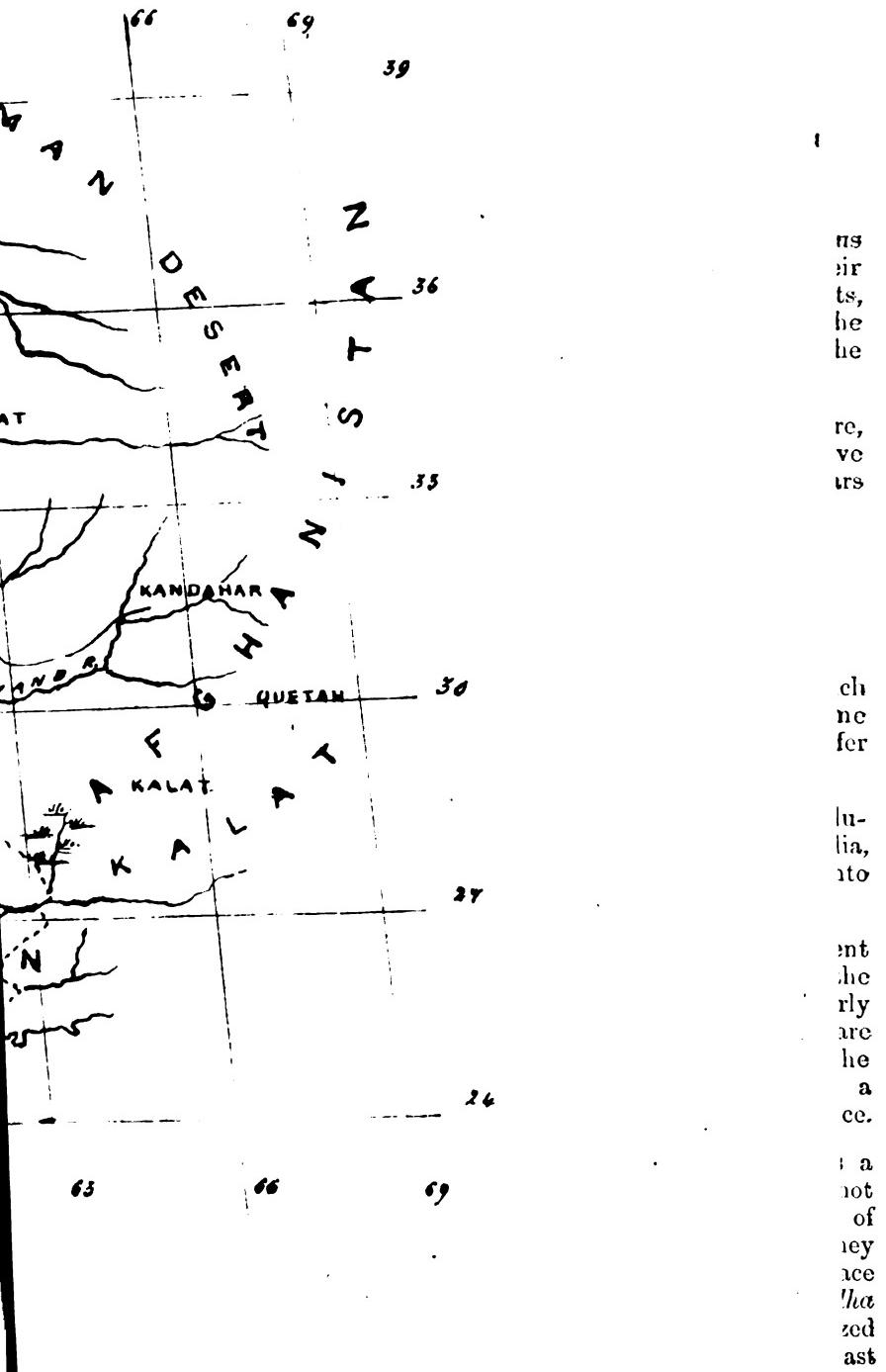
Russia's proceedings east of the Caspian are so well known as to make it unnecessary to dwell on them; but it is worth remarking that before 1873, her official maps showed the whole Turkman country as independent from the Caspian to Balkh. But when Russia became the suzerain of Khiva, this independent Turkomania at once disappeared from the map, and became part of Khiva, whose limits were further extended to within twenty miles of Herat. A year or two before this, the Attrak frontier agreement had been made with Persia, but its terms are differently understood by the two parties, and no real settlement has been arrived at. The object was not, I believe, territorial aggrandisement, but the wish to obtain a practicable commercial and military road to the Oxus, by way of Merv, with no doubt a side view at bullying England, but without infringing the informal understanding existing between us as regards encroachments on Persian territory.

On the conclusion of Major St. John's lecture, which was much applauded, (discussion upon it was postponed till the next meeting on 2th July), His Excellency the Commander in Chief said :—

I am quite certain that the sense of the meeting will be entirely in favour of offering a vote of thanks to Major St. John for the very interesting and instructive lecture with which he has favoured us this afternoon. (Hear, Hear.) It is impossible I think to exaggerate the importance of our relations with Persia, such as they have been and such as they may be. I think Major St. John has administered to us a sort of tonic, for certainly he has not placed our dealings with Persia in the most attractive light, nor indeed have they been anything to make us very proud of; but, still, I think the independence with which he has advanced his views is really a most valuable feature in the lecture, and I also, think that in any lectures which may be given here in future, that quality should always be present. The handling of military questions by men untrammelled by the cares of office, by independent men, might give us very valuable ideas; and, at all events, ideas so put forth should always be received by the military authorities with great respect, and if on examination they are found to be of value, there is no reason why we should be too proud to adopt them.

With regard to the affairs of the institution I believe I may say that we are rather entering on a new era for there is certainly an element of energy apparent in the management of the institution which perhaps has not been present in it throughout its existence. The

increase in the number of subscribers, which has been remarked in the report, is a most satisfactory feature, and I hope that it will continue to be observed in the history of the institution. I think Simla, where circumstances tend to bring together a vast amount of talent on all military and scientific subjects, that it is from the visitor rather than the official we might expect to hear lectures on the institution, and I am sure we should all be most grateful if such as Major St. John has given us, were more frequent than has been the case. Captain Anderson has informed us that this will be arranged, and I am sure that they will be received with the interest. The more frequent regular issues of the Journal also, to me to be a most valuable feature as an effort on the part of management. It is calculated to bring to the minds of people not present that class of interesting information and instruction we enjoy *vivid voce* from the lecturer, and its price certainly places it within the reach of all Sergeants messes, and soldiers' reading and recreation rooms, quite as much as it does to the most wealthy. I trust therefore that the efforts which the council are now making to increase the circulation of the Journal may prove successful. It is needless for me to enter upon the general question of the value of the institution of this sort, as this is self evident, and I shall conclude my remarks by wishing it success.



inc
in
tir
Siv
tal
vis
ins
as
be
be
int
to
ma
not
we
wit
rec
I t:
inc
less
ins
gen

III.

H I N D U - I S M .

HISTORY OF NATIVE RACES IN THE INDIAN ARMY.

Extract from records in the Adjutant General's Office.

1. Respecting the early history and chronology of the Hindus there are no really credible memorials. As Marshman says—"Their history was compiled by poets, who drew on imagination for their facts, whilst their chronology was computed by astronomers, who made the successive ages of the world correspond with conjunctions of the heavenly bodies."

2. The most ancient accounts that we have, such as they are, are contained in the *Védas*, supposed to have been written about fourteen hundred years before Christ. They consist of four books, viz.

1. The Rig-Veda.
2. The Yajur-Veda.
3. The Sáma-Veda.
4. The Athárva-Veda.

Each Veda is divided into two parts, the "*Mantras*" or hymns, which express the wants and aspirations of the people, and thereby throw some light on their social condition; and the "*Brahmanas*," which refer chiefly to their religious rites and ceremonies.

3. The religion taught by the Vedas was unquestionably Hinduism, although in a form now obsolete in India, and is supposed to have been introduced into Hindustan from Persia, or at all events from beyond the Indus.

4. The Vedas enjoined the worship of only one God, "omnipotent omniscient and omnipresent;" and although *Brahma*, the first of the well known Hindu trinity, is mentioned in them, thus indicating clearly the existence of Hinduism, the gods enjoy no pre-eminence, and are not the objects of special veneration. The doctrine inculcated by the Vedas was that the supreme Being first created man, making him a rational being, and then produced the Vedas for his religious guidance.

5. The aborigines of Hindustan are described in the Vedas as a swarthy dark complexioned race, who did not worship the god of the Aryans, a horde of invaders from across the Indus, by whom after a fierce struggle they were ultimately subdued. Abandoning the plains the conquered race betook themselves to the mountains and to the forests of the *Nirbuddha* and *Mahanuddee*, where in their fastnesses they may be recognized at the present day in the *Bheels*, *Sonthils*, *Kóls* and other outcast

tribes—Indian children of the mist, living on plunder and having nothing in common with the people around them, even as regards language or religion. Some no doubt were reduced to slavery by the invaders, and intermarrying with their conquerors ultimately formed, the lowest class of the modern Hindus.

6. Hindu annals describe two races of kings as reigning in Aryans Hindustan from the earliest ages, the race

of the sun and the race of the moon. The

Hindus who originally crossed the Indus, appear to have first established themselves on a tract of country to the north-west of Delhi. Subsequently we find the solar race founding and occupying the Kingdom of Oude, whilst the seat of the lunar government appears to have been at *Pryág*, the modern Allahabad.

7. The Vedas however give a very imperfect account of the state of society at the period treated of, and it was not until many centuries later that two very beautiful epic poems, the *Ramayana* and *Mahabharáta*, made their appearance in the Sanscrit language, and taking up the historical thread described the state of affairs in Hindustan subsequent to the Aryan conquest.

8. The *Mahabharáta* is a vast storehouse of legends, recounting the exploits and victories of the *Pándús* over

the *Kírús*, both branches of the lunar line of

the reigning family. Amongst other numerous legends in this poem, mention is made of a deluge. The scene of the *Mahabharáta* is in the North Western Provinces. The above poems were written and the events referred to occurred at periods not accurately defined in the Heroic Age of India. At the time of the *Mahabharáta* the Aryans were settled in the upper valleys of the Ganges and Jumna. The habits of the people were very simple; they were divided into clans, and each clan was governed by its own head man or leader. They cultivated land, tended and bred cattle, indulged in athletic sports and were always ready to defend their own hearths or raid upon their neighbours. During this period the rite of "Satti", or the burning of the widow with the corpse of her husband, seems to have been instituted; the degrading custom, of polyandry was also in vogue, whilst revenge and mutual reprisals were universal.

9. The period treated of by the *Ramayana* would appear to be later than the *Mahabharáta*, though this is

Ramayana disputed by some. The scene at all events is

far more extended. It represents the Aryan Hindus as not only possessing rich and powerful kingdoms in *Oudh* and *Tirhút* but penetrating into the forests of Central India and the Dakhan and even invading Ceylon. It narrates the adventures and exploits of *Rama*, the hero of the solar race; and afterwards worshipped as the seventh incarnation of *Vishnu*. The people are described as more civilized and luxurious. Polyandry had apparently given way to polygamy,

whilst even monogamy had come into vogue, for one of the main moral purposes of the *Ramayana* was to expose the evils of polygamy.

10. During the Aryan conquest of India, and the periods treated of in the *Mahabharata*, and *Ramayana*, the Bráhmans would appear to have been employed merely as animal sacrificers; they had no political power; the maharajahs or heads of families were their own priests, and performed all their own rites and ceremonies; but gradually as wealth, luxury and ease increased, these duties became more arduous, and the maharajahs began to employ priests to officiate for them. In this manner the Bráhmans got a footing: they rapidly gained power, began to practise astrology, assumed possession of supernatural powers, asserted for themselves a divine origin from *Brahma* the creator, whom they now exalted above all other gods, prescribed new religious doctrines and introduced numerous rites; they were necessarily present at all ceremonies, and in fact making themselves the medium of communication between the people and their gods, they became the most despotic priesthood ever known.

11. Having once established so powerful an influence, they were not slow in taking measures to secure it permanently. A code of rules and precepts religious and secular, were compiled by *Menu* the great Hindu lawgiver, about 800 years before the Christian era. This code, now known as the *Dharma Shastres*, defined amongst other things the caste system, which with some modifications exists to this day. The legislator took the opportunity to put into form, and define what previously had never been authoritatively laid down,

12. There are four castes:—1. Bráhman or priestly caste;—2 Castes. Kshatrya (Rajpoot) or soldier caste; 3.—Vaisya or industrial class;—4. Sudra or servile class.

13. This new code accorded extraordinary dignity and sanctity to the Bráhmans, for whose good it was now asserted all other persons and things were made. Some privileges, it is true, were accorded in a much less degree to the Kshatryas and Vaisyas, but the unfortunate Sudras were regarded as outcasts and altogether degraded, which would seem to indicate that they were probably the descendants of the subdued aborigines.

14. However much the Bráhmans may have desired to preserve these castes separate and distinct from each other, it was manifestly beyond their power to prevent individual members of one caste from intermarrying with those of another—"even in India love will still be lord of all"—and "intercourse between men and women of different castes soon occurred to puzzle and disgust the sages who would be superior to human passions." The offspring of these marriages not belonging to either of the four fundamental castes formed others of their own

and so in course of time this process was productive, as will be seen presently, of numberless mixed castes, most of which adopted distinctive professional titles,

Mixed castes. such as "*Kūmkars*" or potters; "*Kortś*," weavers; "*Chūmārs*," leather workers, &c., &c. All these mixed castes were eventually classified under the general denomination of Sudras, and hence the enormous numerical preponderance at the present day of the servile class over the other three, which succeeded in preserving their individuality. The Bráhmans and Kshatryas from the very first regarded their caste privileges with the utmost jealousy, though instances of their men marrying women of the lower castes were not uncommon; but mixed marriages between the Vaisyas and Sudras became very general. The individuality of the Bráhmans at the time of the invasion of India by Alexander the Great in B. C. 331 was perfectly recognized, and they were described by his historian as the *Brahmanes*, whilst the Army opposed to him by Porus was composed entirely of Kshatryas or Rajpoots.

15. The epoch at which these mixed marriages were put a stop to is not known. Certain it is that they do not occur now, and indeed had the practice continued up to the present time it is clear that the caste system would have destroyed itself, by the indiscriminate commingling of the original castes and endless multiplication of new ones.

16. For many years previous to this a tendency had been developing amongst the Hindus to create new gods, to worship the elements under various personifications, to deify heroes and to worship the three persons of the Hindu triad under numerous different *avatars* or incarnations. This tendency was encouraged by the Bráhmans under whose countenance their gods and goddesses increased so rapidly that the Hindu theology speedily lost all resemblance to the comparatively pure and simple religion taught by the Vedas. Discontent became rife; dissent began to show itself, till at length a reformer declared himself in the person of Gautáma, a Kshatrya, afterwards known as *Boodha* or "the enlightened."

17. The reformed religion as taught by its promoter took a speedy and marked hold of the people. Like Búdhism, B. C. 560. most enthusiasts his earnestness carried him far beyond the bounds he at first proposed to himself; he boldly rejected the whole of the Bráhmanical system of gods and goddesses, repudiated the obligations of caste, and thereby aimed at delivering the Sudras and mixed castes from the oppression of the Bráhmans. He preached a religion pure and simple as that of the Vedas, and declared the only means of securing salvation was not by the penances, sacrifices and other observances prescribed by the Bráhmans, but by the practice of the cardinal virtues, truth, purity, honesty and above all charity.

18. As might have been expected the Bráhmans made the most determined opposition to the spread of these new doctrines, but without

avail—Gautáma succeeded during his own lifetime in securely grafting his doctrines in Kanouj itself, the very stronghold of the Bráhmans, but it was on Gautáma's death in B. C 550 that the religion of Boodh made the most prodigious progress. Two centuries later we find Búdhism triumphant throughout Hindustan, and spreading rapidly south; it extended into Ceylon, Java, Ava, and Siam, to Nipal and Thibet, and so into China, and Japan, where it became, as it still is, the prevailing religion, counting more than 450,000,000 votaries. But even the ranks of the Búdhists were destined not to be free from schism. A sect sprang up amongst them calling themselves *Jainas*, of whom it is

The Jainas. sufficient here to say that whilst denying the divine authority of the Vedas, they retained

the caste system, and acknowledging many of the Hindu gods formed a link mid-way between Hindu and Budhism. It was not until 200 years before Christ that the unceasing exertions of the Bráhmans to uproot Búdhism began to bear fruit, but about that period a reaction took place in Hindustan in favor of Hinduism. In upper India at least the Bráhmans began to regain their ascendancy, and having during the next eight centuries completely re-established their power, they produced a revised and entirely new code of rites and precepts, The Vedic system was transformed almost beyond recognition, hero worship was enjoined, and by degrees a pantheon containing, an inexhaustible company of gods was recognized.

19. This new code is contained in 18 volumes (not however all compiled at the same time) styled the
The Puranas. "Puranas." They are so called because they profess to teach what is ancient, and form the Hindu religion of the present day.

20. Such is the history (in outline) of the religion of this remarkable people, from the earliest times of which we have any memorials, a race of which, at the present day, two-thirds of the Army of India are composed.

CHARACTER.

21. The character of the natives of Hindustan varies so much with the locality they happen to occupy, that it would be impossible to describe it in terms equally applicable to all; and this is true as regard even the residents of our own, or Bengal proper, side of India. Elphinstone attributes this variety of character to climatic or atmospheric influences—"The inhabitants of the dry country in the north, which in winter are cold, are comparatively manly and active. The Maharattas, inhabiting a mountainous and unfertile region, are hasty and laborious; while the Bengalees, with their moist climate and their double crops of rice, where the cocoanut tree and the bamboo furnish all the materials for construction unwrought, are more effeminate than any other people in India.

22. Notwithstanding, indolence or a love of repose may be taken more or less as a characteristic of the whole people.
Indolence.

23. Akin to their indolence is their timidity or want of self-reliance which arises more from a dislike of trouble and responsibility than to a want of physical courage.

24. But though not deficient in actual courage they are certainly wanting in that other quality, by whatever name it be called, which enables a man to bear up against disaster and to undergo cheerily a long course of discouragement.

25. This doubtless is only another form of indolence and disinclination to encounter lengthened difficulties, for Contempt of death. their contempt of death when actually face to face with it is as proverbial as it is an extraordinary contrast to their timidity, when exposed to lesser evils. When his fate is inevitable the lowest Hindu encounters it with a coolness that would excite admiration in Europe. He converses with his friends with cheerfulness, and often awaits the approach of death with the utmost unconcern.

26. A prominent vice of the Hindus is a want of truthfulness, in which they outdo most nations even of the Want of veracity. East. Apparently no moral turpitude attaches to the telling of a falsehood. In courts of law this failing takes the aggravated form of perjury.

27. Litigiousness also must be looked upon as one of the peculiar characteristics of the Hindu. A determination Litigiousness. to prosecute a case to its furthest limits, in spite of adverse decisions and friendly counsels, is a common cause of ruin to the Hindu suitor. Rather than abandon his cause he will appeal from court to court until his expenses far exceed the amount for which he is contending.

28. The general disposition of the Hindus is frugal, and even Frugality. parsimonious; their expenses are small, and though cases of improvidence are common enough, it is a decided characteristic of the Hindu to save if not to make money.

29. Then, the cleanliness of the Hindu in his person (the lowest Cleanliness. classes alone excepted) is proverbial. No other race has so much to do with bathing and ablutions of sorts as the Hindu. Besides the ordinary morning ablutions he bathes before prayer and before every meal. In this respect he contrasts most favorably with the Mahomendan who lives side by side with him.

30. Every careful observer must also have noticed the quickness and intelligence of Hindu children, as compared to those of Europeans of a similar age. The capacity of lads of 12 and 14 is often surprising, and not less so is the rapidity with which their faculties often become blunted after the age of puberty.

31. Their comparative freedom from debauchery and drunkenness is also remarkable; and considering the style of clothing in use by both sexes of the lower orders, the absence of licentiousness is commendable. Nudity is held in especial abhorrence and is strictly forbidden.

32. In marked contrast with this however is the extraordinary license they give to their tongues; the grossest terms are used in conversation even between the different sexes without exciting the least surprise, which Elphinstone attributes to "the simplicity which conceives that whatever can exist without blame may be named without offence," an explanation with which we must be content for want of a better!

RELIGION AND MYTHOLOGY.

33. Going back as far as 1400 years before Christ we find the worship of only one god enjoined—"The all-mighty, infinite, eternal, incomprehensible, self-existent being; he who sees every thing though never seen; he who is not to be compassed by description; who is beyond the limits of conception; he from whom the world proceeds; who is the lord of the universe; light of lights; whose name is too sacred to be pronounced, whose power too infinite to be imagined *Brahm!* Creator, preserver and destroyer of all."

34. Such are the terms in which the deity is apostrophised in the Vedas. That the ancient principle then of the Hindu religion was the worship of one supreme and only god, there can be little doubt; but there is still less, that at the present day the objects of Hindu worship are almost exhaustless, and that those objects are as varied in their attributes as they have been multiplied in their numbers.

35. As has been already stated the Hindu pantheon contains thousands of deities or forms under which the human figure, the elements, the planets, rivers, fountains, stones, trees and almost every thing else in creation are worshipped.

36. According to the traditional mythology of the Hindu religion, *Brahm*, the supreme being, created the world. He next created the goddess *Bhavani* or "Nature," who brought forth three sons, the persons of the famous Hindu Triad :—

1. *Brahma*, the creator.
2. *Vishnu*, the preserver.
3. *Siva*, the destroyer.

37. To these three gods the general management and government of the world were entrusted.

38. Of this triad *Brahma*, the creator, is the least regarded at the present time. His mission is supposed to have been completed, and his power to be dormant, until it shall be required again for the creation of a new world after the present one has been destroyed. The effigy of *Brahma* represents him as a red or golden colored figure with four heads. He once had five, but one was nipped off by *Siva* in a quarrel with that god. He is generally attended by his goose or swan.

39. The wife of *Brahma*, goddess of wisdom, music and poetry, and inventor of the Sanscrit language. She is represented as a young female with a fair complexion, standing on a water lily holding a lute in her hand, without the usual superfluity of limbs, and not unfrequently of a graceful figure. Although the worship of *Brahma* has declined, the annual festival in honor of his consort in the month of January is highly honored; and as absolution for the sins of lying and giving false evidence is alone to be obtained from this goddess, devotional exercises in her honor are not likely to fall into disuse amongst Hindus. *Sarasvati* is a river goddess, but the stream to which she gave her name has dried up. It used to flow through the now arid plains north west of Delhi, and like the Jumna joined the Ganges at Allahabad, which place is still spoken of by natives as *Tribeni* or the confluence of *three*, not two rivers.

40. The son of *Brahma*. architect of the universe and forger of *Visvakerma* (Vulcan) arms to the gods. He also presides over arts and manufactures. In paintings he is represented as a white man with three eyes, and in his sculptured representations in the cavern temples of Ellora, &c., he is shown in a sitting posture, with legs perpendicular, holding in one hand the fore-finger of the other.

41. Is the second of the *Trimerti* or Hindu triad, the preserving *Vishnu* (the Preserver.) spirit of the supreme being *Brahm*, and the favorite god of the Hindus, especially in his incarnation of *Krishna*. He is usually represented of a dark blue or black color, with four arms, in one of which at least he holds a lotus or water lily. He is often painted with his favorite wife *Lakshmi* in his arms or riding *Garuda*, the king of the feathered tribes a youth with wings, and the beak of a bird. *Vishnu* is very extensively worshipped as "the Preserver." He is considered a household god, and sanguinary sacrifices are therefore not offered to him. The worship of *Vishnu* is surrounded by a large circle of myths, not shared to the same extent by any other deity. Whenever any great disorder, moral or physical, disturbed the world, *Vishnu* appears to have descended "in a small portion of his essence," in various disguises to set things to rights and

preserve the equilibrium. He is said to have so reappeared in nine incarnations or *avatars* as follows, and is still looked for in one more—

1. *Matsya*.—As a fish, to recover the Vedas said to have been lost in the Deluge.
2. *Karmavatara*.—As a tortoise, so as to support the earth on his back, whilst the gods and genii, using a huge serpent as a rope, churned the sea with it into milk, extracting from it amongst other things *Amrita* or the water of life, the moon and the goddess Lakhshmi.
3. *Varaha*.—As a boar, who raised with his tusks the world from the bottom of the waters of the Deluge.
4. *Nara Singh*.—As a man lion, when he destroyed a tyrant who scoffed at his powers.
5. *Vamana*.—As a dwarf, to recover the universe from Rajah Bali, to which monarch Brahma had indiscreetly given it.
6. *Parasurama*.—As a youthful hero, who made war on and exterminated the Kshatrya or warrior tribe of India, who were oppressing mankind and, had barbarously caused the death of his parent.
7. *Rama Chandra*.—As a prince (the hero of the poem *Ramayana*), to punish a monstrous giant, *Ravana*, who reigned over Lanka or Ceylon, which he accomplished with the aid chiefly of *Hanuman* the monkey general. Rama Chandra is usually depicted as a green man seated on a throne under an umbrella, the emblem of sovereignty. His wife, *Situ*, is often worshipped with him, and is painted of a deep yellow complexion. The worship of this incarnation of Vishnu is very extensive, and his name twice repeated “*Ram Ram*” is the ordinary form of salutation among all classes of Hindus.
8. *Krishna*.—As an Indian Hercules and Apollo combined, to destroy *Kansa* an oppressive monarch and incarnate Titan, the natural enemy of the gods. Performing marvellous feats of strength, he was the delight of the *Gopis* or milk-maids, of whom he married seven or eight. He was ultimately killed in a wood by a chance arrow from the bow of a hunter, but was afterwards revivified in the shape of the god *Jagganath*. The image of *Radha*, the wife of a goatherd and favorite mistress of Krishna, is often set up and worshipped with that of Krishna himself.
9. *Buddha*. As a sage, to create a reform in the religion of the Bráhmans, and reclaim them from idolatry and their proneness to animal sacrifice.

10. *Kalki*—Is still to come, in which the dissolution of the world will take place. The 7th and 8th incarnations, *Rama-Chundra* and *Krishna*, have in a great measure superseded the worship of Vishnu himself, in some parts of India.

42. The wife of Vishnu and goddess of beauty and fortune. She *Lakshmi Prosperity*. is said to have been borne, like Venus, of the foam of the sea. After her birth all the gods became enamoured of her beauty, but Vishnu after a smart competition with *Siva* at last won her. She is painted yellow sitting on a waterlily and holding another in her hand.

43. Is the third deity of the Hindu Triad, also called *Mahadeo* or *Bhyru*. He is usually pourtrayed of a *Siva* (the destroyer). white or silver color, with a third eye in the middle of his forehead pointing up and down. He is sometimes given five faces. Round his loins is usually girt a tiger's skin, with serpents in his hair, which is matted and of a reddish color; on his forehead is a crescent, and round his neck a necklace of skulls, emblems of his attribute, "destruction." The bull *Nundi* always accompanies him. The followers of *Siva* assert that the sacred Ganges flowed from the matted locks of their favorite god, whilst the Vishnaivas, or worshippers of *Vishnu*, contend that it issued from the sacred foot of their deity. It is one of the absurdities of Hindu mythology, that all the gods and their followers are represented as at constant feud with each other. A most ludicrous instance of this was a squabble said to have occurred between *Siva* and *Brahma*. One of the five heads of the latter, being more valuable than the others, began a vigorous altercation with that god, and becoming more and more offensive so exasperated *Siva*, that she forthwith nipped off the offending member with the nail of his left thumb! Having performed, this operation he found he could not get rid of the head, and in some representations of *Siva* a head may be seen adhering to the hand, no less a head than that of *Brahma*, the creator, the first person of the Triad, of which he himself was only the third. *Brahma* has since been obliged to be content with only four heads!

44. In the worship of this god and at festivals in his honor, the *Sanyasees* or worshippers perform the most barbarous and painful rites, the best known of which is the *Churruk Poojah*, or swinging by hooks fastened through the flesh of the backs of the devotees. The Hindus are most assiduous in their devotions to *Siva* during epidemics and unhealthy seasons.

45. Is the wife of *Siva*, she is also called *Devi* or *Mahadevi*, *Durga*, *Juggudhatri*, *Bhavani* and *Kali*. *Parvati*. She is the goddess of destruction, and is described as terrible in form and irascible in temper; in this character she is painted white. Having, by a display of extraordinary valour, defeated a giant named *Durga*, she assumed his name, and as *Durga*

she is more extensively worshipped than in any of her other characters, more particularly in Bengal proper, where during her festival (*Durga poojah*) all business is suspended. This festival in upper India is known as the *Dussera*. *Durga* is represented of a yellow complexion. As *Durga* and *Juggudhatri*, her images are, on conclusion of the ceremonies, cast into a river. Under the name of *Bhavani* she is invoked by women in labour, as the goddess of nature and fecundity. She is supposed (as *Bhavani*) to have been the first goddess created by the supreme being to give birth to the famous Hindu Trinity.

46. Another form in which this goddess is worshipped is *Kali*, when she is painted black or dark blue. Sacrifices of all kinds of animals are made to her at her temples, of which there is a famous one at Kali Ghat near Calcutta, the floor of which during her festivals is often deluged with blood. The image of this goddess, with protruding tongue, and necklace of bleeding human heads, is truly horrible, as are the rites performed in her honour.

47. Next in importance are the old elemental gods, the first of which is *Indra*, god of the air and heavens.
Indra (Jupiter.) He is represented as a white man sitting on an elephant, with a thunderbolt in his hand. His own particular heaven is the north pole. His worshippers celebrate his festival in the month of August, when they pray for the blessing of a future residence with him in his celestial abode.

48. Is the personation of the orb of light and heat, and so a manifestation in all three persons of the *Trimurti*, of that omnipotent sun the supreme creator *Brahm*; in the east at morning as *Brahma*, *Creation*; at noon overhead as *Vishnu*, *Preservation*; in the west at evening as *Siva*, *Destruction*. This deity is naturally held in great veneration by all classes of Hindus, and his images are to be found in most of their temples. He is represented of a yellow complexion, with rays of glory round his head. He rides a chariot with only one wheel, drawn by a green horse with seven heads.

49. The Ocean god. He is painted a fair man with four arms, riding on a water animal something like an otter. He is invoked in times of drought, for the clouds and rain are under his control also, and he is worshipped extensively by the fishermen of Bengal.
Varuna (Neptune.)

50. The god of the winds. He is depicted riding an antelope, with a pennon and arrow head in his hands, indicative of swiftness; he is called the messenger of the gods.
Pavana (Eolus.)

51. The god of fire, one of the most ancient deities of Hindu mythology. At most of the Hindu ceremonies and especially at the marriage rite, *Agni*
Agni.

is invoked, being looked upon as a mediator between gods and man, and protector of the homes of mankind. He is generally represented of a red or flame color holding a spear and riding a ram.

52. The god of *Patala* or the infernal regions, and judge of the dead. As in Hindu mythology there are
 Yama (Pluto.) many heavens of various degrees of felicity, the roads to which are lined by ministering angels awaiting the approach of the good, and interspersed by streams of water and other agreeable things, to render the journey pleasant, so are there numerous hells of different degrees of severity, the roads to which are long and painful, over burning sands and pointed red hot stones. Along these and amidst showers of scalding water and molten metal, and through caverns filled with snakes, tigers, and inconceivable horrors, the Hindu sinner has to thread his way to the palace of *Yama*. This deity is represented of a most terrifying aspect. From his throne he judges Hindu sinners and consigns them to their different hells. A buffalo is his mode of locomotion. He carries a club in one hand and a cord to bind the wicked in the other. Hindus make daily oblations of water to *Yama*, and the second day of the month *Kartik* (October and November) is specially dedicated to him and his sister *Yamuna*, or the river goddess *Jumna*.

53. The god of wealth, a deity of whom very little is said in
 Kuvera (Plutus.) Hindu mythology, but whose favors are by no people more valued than by Hindus.

54. The god of war and leader of the celestial armies. He is
 Katikeya (Mars.) represented of a yellow colour riding a peacock with from one to six faces, and two, four, or six arms, holding various weapons. He is the son of *Siva*, but was nourished in some mysterious fashion in the bosom of the Ganges. He is worshipped in the month of *Kartik* in the shape of huge images which are, like those of *Durga*, eventually cast into the Ganges.

55. The god of love, supposed to have been conceived in the heart of *Brahma*, is one of the most pleasing creations of Hindu fiction. He is represented as a handsome youth, sometimes riding on a parrot or loony and attended by nymphs, one of whom bears his banner with the device of a fish on red ground. He carries a bow of flowers strung with bees, and five arrows each tipped with buds. The cuckoo, humming bird, and gentle breezes are said to accompany him as he wanders over the world.

56. Perhaps, the worship of no deity in all the Hindu category is so universal with every sect of Hindus as that of *Jagganath*. It is calculated that 200,000 persons visit his celebrated pagoda in Orissa every year. Pilgrims from the remotest corners of India flock, at the time of the festivals of *Jagganath*, to worship at his hallowed shrine. Numbers go to die there, and some even throw themselves under, and are crushed by,

the wheels of the immense car on which this hideous image is dragged about during the festival of the *Rath-Jathra* in July. On these occasions he is accompanied by the images of his brother and sister *Bala Rama* and *Subhadra*. The Bráhmaṇs of the temple distribute food to the pilgrims who all eat together, and it is worthy of note that this is the only occasion on which the highest Hindu can break bread and eat with the lowest without prejudice to his caste. The image of *Jagganath* is made of black wood and has a hideous visage with distended mouth. He has no legs and arms, and the tradition is, that the architect god *Visvakerma*, having undertaken to construct *Jagganath* as a receptacle for the bones of *Krishna* after he had been shot by the hunter, stipulated that he was not to be interfered with. Fifteen days later, however, a king who was interested in the matter, went to see how he was getting on, on which *Visvakerma* desisted from his work, and left without legs or arms. *Jagganath* is therefore a re-animation, and a very popular one, of their old favorite *Krishna* under a new form.

57. Is the vehicle and companion of *Vishnu*. He is the emblem of strength and swiftness, and is represented Garuda. as a youth with the wings and beak of a bird. Sculptured images of *Garuda* are to be found in the cavern temples of Elephanta, Ellora, &c.

58. The chief general of the monkey king, who assisted *Rama* Hantman. Chundra in his war against the giant *Ravana*, related in the *Ramayana*. He is the son of *Pavana*, the god of the winds, by a female monkey, and bears a very marked resemblance to his mother. He is very extensively worshipped, sometimes alone, but often in the society of his former companion in glory, *Rama*. In consideration for him Hindus allow monkeys to do any amount of mischief without interference.

59. The goddess of earth, to whom many Hindus offer daily Prithivi (Ceres.) sacrifices.

60. The god of good luck, and remover of difficulties and obstacles. Ganesa. This deity is represented by an outrageous figure, a short fat red colored man with a big belly, and the head of an elephant. He has four arms in which he holds an elephant goad, a shell, a ball, and a pancake; he is said to be fond of pancakes. No public festivals are held in honor of *Ganesa*, but his image stands in almost every house, and he is worshipped by men and women with the usual ceremonies and offerings, especially when they are about to embark upon any important undertaking. On commencing a book or other composition, his assistance is always invoked, and his picture is frequently drawn, as a propitiation, over the doors of houses and shops to ensure success and good fortune to the owners.

61. The river goddess of the Ganges. All castes of Hindus worship this goddess of their sacred stream. Ganga. Numberless temples in her honor are erected

on the banks of the river, and in every part of the country. The sacred waters are highly reverenced and carried away by pilgrims, who come journeys that take them often several months to perform, for the privilege of bathing in the holy stream. Persons, in their dying moments are carried to its banks to breathe their last, by which means the deaths of many are doubtless hastened, and in some other cases actually produced. The goddess *Ganga* is described as a white maiden wearing a crown, and walking on the surface of the waters with a lily in each hand.

62. To the foregoing category of gods and goddesses may appropriately be added a brief notice of the planets, which are also worshipped under different forms by the Hindus, and after whom the days of the week are named. The planets are always invoked in the ceremonials prescribed for the removal of the evil consequences of being born under an unpropitious constellation.

63. The moon is of the warrior caste of Kshatryas, and is represented as two-armed, having in his Soma (Lunus.) hands a club and a lotus, and riding in a car drawn by an antelope. To be born under his influence is considered most fortunate, especially on a Monday, "Sombar," over which he presides.

64. The planet Mars is also of the Kshatrya caste. He is painted red with four arms holding a trident, club, Mangala (Mars.) a lotus, and a spear. He rides a ram. It is considered fortunate to engage in battle on a Tuesday, "Mangal," which is devoted to him.

65. The planet Mercury. He too is of the warrior caste. He is made to look of a greenish tint and usually Budh (Mercury.) rides a lion. *Budh* is the god of trade and the protector of merchants. He is therefore a special object of devotion to the Vaisya caste, who deem it fortunate to be born under this planet. He presides over "Budh-war" or Wednesday.

66. The planet Jupiter is of the Bráhman caste and of a golden color. His vehicle is a horse, and he holds in Brihaspat (Jupiter.) his hands his beads and a lotus. It is considered fortune to be born under *Brihaspat*. The mango tree is also sacred to him. "*Brihaspatwar*" or Thursday is the day of the week over which he presides.

67. The planet Venus is a Bráhman, and is held in great estimation by the Hindus. In one of the zodiacs Sukra (Venus.) he is represented seated on a camel with a large hoop in his hands. He is of fair complexion, middle aged, and agreeable countenance. A person born under this planet is believed to have a good chance of being gifted with the power of omniscience, and

of possessing "the gifts of fortune and blessings of life, amongst which are many wives!" He presides over and has given his name to "Sukarwa" or Friday.

68. The planet Saturn is represented of a dark color, holding a sword, arrows, and two daggers in his hands.
Sani (Saturn.) He rides a black eagle. He is of the Sudra or lowest caste, and is old, ugly, and of an evil disposition. The ills of life are ascribed to his influence and it is deemed very unlucky to be born under him. Numerous ceremonies in his honor are therefore resorted to, to appease the wrath of this deity. He presides over "Saniwar," or Saneechar Saturday.

69. Most of the principal gods are described as having heavens of their own, with a special locality assigned
The Heavens of the Gods. to each.

70. Angels innumerable minister to them in their respective mansions, which are described as glittering
Angels. with gold and jewels.

71. Besides the angels and good genii that inhabit the different
Evil Spirits. heavens, there are various descriptions of spirits spread through the rest of the creation.

72. The *Asuras* are relations of the gods, and said to have sprung from the thigh of *Brahma*. They Asuras. inhabit *Patala* or the lower regions, having been disinherited by their progenitor.

73. The *Rakshasas* are giants of evil omen, also related to the gods, against whom they sometimes wage war.
Rakshasas.

74. The *Pisachas* are demons haunting the earth, and inhabiting woods and forests. The term is sometimes applied to the aborigines and present wild mountain tribes. One of the hymns of the Rig-Veda calls upon the god Indra "to destroy the tawny-colored fearfully-roaring *Pisachas*, and to annihilate the *Rakshasas*." A "Pisacha marriage" is one of the eight recognised sorts of marriages. It is one in which the "damsel is neither purchased nor seduced, nor carried away captive, but simply taken at a disadvantage. When a girl finds herself likely to become a mother, without being able to furnish a satisfactory reason for her maternity, she used to plead that she had been victimized by a *Pisacha* of the woods; and probably from this circumstance the term has come to be applied to all cases in which a damsel had been taken at a disadvantage by a mortal lover."

75. *Bhutas* or *Bhuts* are malignant spirits, haunting cemeteries, lurking in trees and animating dead bodies. *Bhutas.* They correspond to the ghosts and goblins of our nurseries, are firmly believed in by all ranks and ages in India.

76. To the above category may be added the village gods, of which one (and sometimes two or three) Village Gods. exists in almost every village, being sometimes one of the recognised gods, but oftener a deceased local celebrity deified for the occasion, and worshipped in the shape of a mound of earth or stone at the foot of a *Pipal* or other sacred tree.

77. Owing to this multiplicity of gods, the Hindu has practically no option but to select some one deity as Hero worship. the object of his own particular devotion. It has been said already, that *Vishnu* in his incarnations of *Rama* and *Krishna* is a very general favorite, although in Bengal proper three-fourths of the population worship goddesses, chiefly *Parvati*, under her designation of *Devi*.

78. Each Hindu goes through his exercises and devotions alone, either in his own house, or at any temple, Daily devotions. pond, or stream that suits him.

79. It is well known that the Hindu doctrine in regard to a future state is a belief in the transmigration Transmigration of souls. of souls, but they believe also that between the periods of their re-appearance in different shapes on earth, they may enjoy thousands of years of happiness in one of the numerous available heavens. Hence the aim and end of the Hindu's prayer, is to obtain from the God of his choice the privilege of spending these intervals with him in heaven.-

FESTIVALS.

80. A people with so crowded a pantheon of gods have naturally a correspondingly large number of festivals in their honour. The Hindus have no less than 142 spread over the year, of which the following are the most important.

81. Occurs in January and is connected with the sun's entry into Capricorn. Pilgrimages are undertaken to Makar ke Sankranti, Allahabad at this season to bathe at the *Tribeni* or confluence of the three rivers. Alms are freely bestowed on the Bráhmans at this festival in return for their religious expositions.

82. Also occurs in January, and is the first day of the Holes saturnalia, for which the preliminary arrangements are now made. Both sexes dress in "basantee" or yellow-colored clothes, and celebrate the festival with much singing and sprinkling of red powder (*abeer*)—*Kamadeo* (Cupid)

is supposed to be busy amongst the young and beautiful at this season, casting his darts in every direction.

83. Takes place at the end of February or beginning of March, and is observed in honor of the birth of *Siva*, Sioratree. "the destroyer." On the previous day all Hindus eat but one meal, and on the day of the festival itself they fast altogether, abstaining even from water. In the evening the fast is succeeded by a feast accompanied with music, singing, dancing and the worship of *Siva*.

84. Is the Hindu carnival, and occurs about the end of February or beginning of March. This festival ushers Holee. in the Spring. The *Holee* or *holka*, a sort of bonfire, which was collected on "*Basant Panchmee*," is now burnt. The festival is said to be in commemoration of the sports of *Krishna* and his mistress *Radha*, who on this day, tradition says, amused themselves with rocking, and throwing red powder at each other. The *Holee* is characterised by indecent songs, drunkenness, and indiscriminate throwing about of the red *Holee* powder. Women are considered fair game if encountered moving about on this festival, and the most indecent jests are made at their expense.

85. Takes place about the end of March or beginning of April, Ram-Noumee. and is the anniversary of the birth of *Rama*, the 7th incarnation of *Vishnu*. The worshippers of this god refrain from both food and water on this festival. The observance of this feast being very general, immense numbers of colored images of *Ram* are made in clay, and sold to the worshippers.

86. This festival occurs when the sun enters *Aries*, and is the occasion of the great fair at Hardwar, during Suttoo Sankránt. which it is considered meritorious to feed the Bráhmans with suttoo and sugar.

87. Is a moveable feast and is dedicated to the *Shradh* rites of Smaotee amawus, deceased ancestors.

88. Is held on the tenth day of the new moon of *Jeth* (May—June), and commemorates the birthday of Das-ehra Jeth. the goddess *Ganga*. On this day all Hindus who are able to do so, bathe in the Ganges, and give alms to the Bráhmans living on its banks. By so doing they secure the benefits of "das-ehra" "ten-removing" (sins); an attribute of the goddess *Ganga*, "whc effaces ten sins, however heinous, of such as bathe in her holy water."

89. Is the great annual fast in the month of *Jeyt* (May—June) Nirjulla Ekaduashée. on which no water or food of any sort is taken.

90. Occurs on the 8th day of the moon's wane, in *Sawun* (July—*Janam Astomee* August), and is the anniversary of *Krishna's* birthday. It is observed as a strict fast. After the usual ceremonies of worship the people indulge in acts of rude merriment, accompanied with music, dancing and singing, finishing up by bathing in a body.
91. Is a festival held on the 14th day of the new moon, in *Bhadon* (*Anant Choudas* August—September), in honor of *Vishnu*, with the title of *Ananta* or "infinite." On this day Hindus tie a twist of *doob* grass or cotton round their arms, the men on their right, the women on their left arms. The armlets so formed have fourteen (*char + das = choudas*) knots. The festival ends with the usual procession and casting of the images into the river. Everything offered to the god on this occasion must be fourteen in number.
92. Is held in the month of September and is another festival devoted to the *Shradh* ceremonies of departed relatives.
93. The festival in Bengal is called "Durga *pooja*," and commences on the sixth day of the new moon of *Nouratree*. Asin (September—October), and continues to the 10th. Each day has its own peculiar ceremonies, but the fourth is the sacrificial day, when buffaloes and male goats and sheep sacrificed by decapitation before the idol, to which the heads with some of the blood in plantain leaves are presented as offerings. The worshippers then daub themselves with the mire formed by the blood of the slaughtered animals, and go through various other disgusting rites. The last day of the festival is the 10th of the month on which is celebrated the *Dasséra*.
94. A feast in commemoration of the victory gained by *Rama* over the *Rakhas Ravana*, king of Ceylon. *Dasséra*. A pageant called the *Ramleela* is gone through, consisting of an out-door theatrical representation of the storming of *Ravana's* castle, made of bamboo framework covered with paper; conspicuous in the midst is the giant himself, a huge figure with many arms, each grasping a weapon, and bristling with fireworks. Beside him sits *Sita*, the wife of *Rama*, whom the giant has abducted. Without, stands the enraged *Rama* demanding the restitution of his wife, which being indignantly refused, the besiegers advance to the attack. Conspicuous amongst the assailants is *Hanuman* with his army of monkeys (men dressed up to represent monkeys, tails and all complete). The assault is at first repulsed, but is speedily renewed, and this time with success. *Sita* is rescued, and *Ravana* on the point of being captured when he blows up, thus finishing a *tamasha* much appreciated by all creeds of natives.

95. The Indian "feast of lanterns" occurs in October, and is held in honor of the birth of *Lakshmi*, the goddess of wealth and fortune. On this day every Hindu closes his annual accounts, and however poor makes an offering with the usual bathing ceremonials to the names of his ancestors. Houses are all freshly *leaped*, and thoroughly cleansed throughout. Every householder in the evening lights at least 14 lamps whilst many Hindus illuminate the whole of their houses with long rows of lights, which as the festival always falls in *Amawas*, or the dark half of the moon, has a very picturesque effect. *Bettasas* and some other sweetmeats of sugar, representing horses and various animals, are only made for this feast. Gambling goes on all night, sometimes for enormous stakes. Conjuring and magic are practised, and there is a general wakefulness. The Dewalee is the end of the Hindu commercial year. Thieves are particularly energetic, considering that if they succeed in thieving on an occasion when all the world is wide awake, good luck must attend their operations throughout the coming year.

96. Or "god-walking," called *Eka-dasee* ($1 + 10 = 11$) because it falls on the 11th of the month *Kartik* Deo-outhan eka-dasee. (October—November), is the commemoration of the waking of *Vishnu* from his four months' sleep. The image of the sleeping god is placed on a chair and rocked, with the swords *Ootist ! ootist ! awake ! awake !* The night is passed with music and singing.

97. The great bathing festival of the Ganges comes off at the full moon in October. It is noted for the *Ganga Ashnan*. gatherings at Garmaktesar, Bithoor, Allahabad, Sonepore, and other places.

98. Eclipses of the Sun and Moon. Hindus on the occurrence of eclipses perform various ceremonies, such as pouring out water to deceased ancestors, setting up gods, making offerings, &c.

RELIGIOUS RITES AND CEREMONIES.

99. The *Karamas* or ceremonies of the Hindu are too numerous to give a detailed account of them all. To attempt this it would be necessary to begin at a period anterior to his birth, when the Hindu mother first indulges in the hope of offspring, and following him through almost every incident of his life only leave him thirteen days after death, when his spirit, provided by his friends with food and drink to sustain him on his journey, finally wings his flight to another sphere. Only the most important of these ceremonies will therefore be described here.

100. *Jatkaram*.—On the birth of a male child the father or a kinsman goes forthwith for the family pundit Birth (Prohit), who is at once asked whether the

child has been born at a propitious time or the reverse. The Prohit immediately consults the stars with many forms and ceremonies and finally draws out the child's horoscope or *janam-patree*, in which every particular regarding the birth, ruling constellation, parentage, ancestry and future prospects are elaborately set forth. The length and nature of his *janam-patree* usually varies with the magnitude of the fee the Prohit expects to get for these services. If after reference to the constellations it is found that the birth occurred during a propitious period (*achee saeat men*) the family barber (*Nai*) is despatched for all the relations and friends of both sexes, and for five Brahmans, who assemble at the house of the father and tender their congratulations. Then begin various ceremonies in which the Prohit and Brahmans take a leading part, making use of fire and small balls made of turmeric, ghee, rice and barley-meal. These ceremonies occupy two or three hours. For the first five days after her confinement, the Hindu mother is attended by a *Chamain* or female *Chamar*, and only eats uncooked food, made of sugar, ghee and spices. On the sixth day the midwife departs, the mother is allowed to partake of cooked food, and the whole house, till then unclean (*Sootak*), is *leeped* or white-washed. Dinner is then served to the attendant members of the family, after which they disperse. Singing and music, however, and the congratulations of friends is carried on until the 12th day, up to which the mother is allowed to touch no one. On the 12th day friends offer various presents, and the mother having been bathed and dressed by the barber's wife (*Naeen*), the restriction as to touching is removed. The ceremony of naming the child (*nama karam*) is then gone through in the court yard (*angaun*). The Prohit decides on the name by an elaborate process connected with the child's horoscope, which it is not necessary to describe, and the night being passed in singing and *natching*, the relations disperse in the morning. If the boy is born in the 19th *Nakshatra* or lunar mansion called *Mool*, the mother is not clean until the 27th day, and is therefore unable to touch any one until the expiration of that period ; nor is the father permitted to look upon his child except as a reflection in melted ghee. Everything is at once under a ban. The inmates of the house can carry on their avocations, but no one is allowed to enter from without. The father neither shaves nor sends his clothes to the wash, and the mother only leaves the house by night. On the expiration of 27 days the Prohit is again summoned, and a most elaborate ceremony is gone through, called the *na-paki pooja*, in which many Brahmans take part, and which is a very expensive affair for the parents. It concludes by the Prohit at last announcing that the incubus of the *Mool* or unpropitious birth has been removed, and the establishment purified. There is a certain condition of this 19th constellation, happily rare, on the occurrence of which should a child be born, the father is prohibited from beholding him for the space of twelve years !

Devotions to the goddess *Bhavani* are assiduously practised on these occasions.

On the birth of a female child the bare rites only are observed, all feasting and rejoicing being dispensed with.

101. Between the ages of one and three years, the ceremony of

Mooran or shaving of the head takes place.

Shaving the head (Mooran.) The Prohit fixes on the propitious day, on which the child with his female relations and friends repair to the family shaving spot. It may be Allahabad, Benares, Muttra, or other holy spot, such as a ghat on the Ganges or Junna, or even the village shrine, but always the same spot. Arrived at the appointed place and the child ready, the barber demands largess, nothing can be done without *Bukshish*. The barber satisfied, the shaving proceeds; one lock of hair called *choorkee*, being invariably left on the top of the head. A dinner is given in the evening, and the night is passed in singing and merriment. Next day the party start homewards.

102. *Kuranbeda* or *Chedan*.—The same ceremonies are gone

through with this as with the *Mooran* rite.

Boring of Ears.

The Prohit, having fixed the day, the party

repair to the spot where the child had been shaved. The barber is again the operator, but this time bores the ears of the child in two places, lobe and cartilage; gets his present and the party returns on the following day. This ceremony cannot be performed on even years of age. It must always be done on the 3rd, 5th, 7th, &c.

103. *Upanayana-Juggco pubeet*.—As this is the most important

Investiture of Janeo or Bráhmanical cord. religious event in the life of the Brahman, so it is preceded by most elaborate astrological calculations, and accompanied by ceremonials extending over several days. It may be noted here that the 19th lunar mansion (*Mool*), so much dreaded at birth, is considered propitious for this ceremony. At about the age of eight years, and it should certainly be done before he is fifteen, the Brahman boy is invested with the *Janeo* or Bráhmanical cord. The receiving of the *Janeo* is considered the second birth of the Hindu, who is thenceforth called "twice-born." This ceremony has therefore not inappropriately been styled the baptism of the Hindu. Prior to this the lad, though a Bráhman of the Bráhmans by birth, is not a Brahman at all in religion, and his seniors will not eat with him. Not being yet a Brahman the lad may himself eat or do almost anything without prejudice to caste. By this rite however he is admitted into the Brahmanical or sacerdotal order, and, commensurate with the importance of the occasion, is the amount of ceremony used and expenses incurred. The particulars of the investiture are most tedious and need not be related. The *Janeo* itself must only be made by Bráhmans. It consists of three strings or five threads of spun cotton. As much as will wind round the hand ninety-six times is taken, and the three threads twisted together with a spindle; it is then folded into three which are again twisted together; this is a second time folded into three and twisted together; and it is then tied in a knot at each end. The *Janeo* is worn over the left shoulder next the skin, extending

child has been born at a propitious time or the reverse. The Prohit immediately consults the stars with many forms and ceremonies and finally draws out the child's horoscope or *janam-patree*, in which every particular regarding the birth, ruling constellation, parentage, ancestry and future prospects are elaborately set forth. The length and nature of his *janam-patree* usually varies with the magnitude of the fee the Prohit expects to get for these services. If after reference to the constellations it is found that the birth occurred during a propitious period (*achee saeat men*) the family barber (*Nai*) is despatched for all the relations and friends of both sexes, and for five Brahmans, who assemble at the house of the father and tender their congratulations. Then begin various ceremonies in which the Prohit and Brahmans take a leading part, making use of fire and small balls made of turmeric, ghee, rice and barley-meal. These ceremonies occupy two or three hours. For the first five days after her confinement, the Hindu mother is attended by a *Chamain* or female *Chamar*, and only eats uncooked food, made of sugar, ghee and spices. On the sixth day the midwife departs, the mother is allowed to partake of cooked food, and the whole house, till then unclean (*Sootak*), is *leeped* or white-washed. Dinner is then served to the attendant members of the family, after which they disperse. Singing and music, however, and the congratulations of friends is carried on until the 12th day, up to which the mother is allowed to touch no one. On the 12th day friends offer various presents, and the mother having been bathed and dressed by the barber's wife (*Naeen*), the restriction as to touching is removed. The ceremony of naming the child (*nama karam*) is then gone through in the court yard (*angau*). The Prohit decides on the name by an elaborate process connected with the child's horoscope, which it is not necessary to describe, and the night being passed in singing and *natching*, the relations disperse in the morning. If the boy is born in the 19th *Nakshatra* or lunar mansion called *Mool*, the mother is not clean until the 27th day, and is therefore unable to touch any one until the expiration of that period ; nor is the father permitted to look upon his child except as a reflection in melted ghee. Everything is at once under a ban. The inmates of the house can carry on their avocations, but no one is allowed to enter from without. The father neither shaves nor sends his clothes to the wash, and the mother only leaves the house by night. On the expiration of 27 days the Prohit is again summoned, and a most elaborate ceremony is gone through, called the *na-paki pooja*, in which many Brahmans take part, and which is a very expensive affair for the parents. It concludes by the Prohit at last announcing that the incubus of the *Mool* or unpropitious birth has been removed, and the establishment purified. There is a certain condition of this 19th constellation, happily rare, on the occurrence of which should a child be born, the father is prohibited from beholding him for the space of twelve years !

Devotions to the goddess *Bhavani* are assiduously practised on these occasions.

On the birth of a female child the bare rites only are observed, all feasting and rejoicing being dispensed with.

101. Between the ages of one and three years, the ceremony of Mooran or shaving of the head takes place.
Shaving the head (Mooran.) The Prohit fixes on the propitious day, on which the child with his female relations and friends repair to the family shaving spot. It may be Allahabad, Benares, Muttra, or other holy spot, such as a ghat on the Ganges or Junna, or even the village shrine, but always the same spot. Arrived at the appointed place and the child ready, the barber demands largess, nothing can be done without *Bakshish*. The barber satisfied, the shaving proceeds; one lock of hair called *choorkee*, being invariably left on the top of the head. A dinner is given in the evening, and the night is passed in singing and merriment. Next day the party start homewards.

102. Karanbeda or Chedan.—The same ceremonies are gone through with this as with the *Mooran* rite.
Boring of Ears. The Prohit, having fixed the day, the party repair to the spot where the child had been shaved. The barber is again the operator, but this time bores the ears of the child in two places, lobe and cartilage; gets his present and the party returns on the following day. This ceremony cannot be performed on even years of age. It must always be done on the 3rd, 5th, 7th, &c.

103. Upanayana-Juggoo pubert.—As this is the most important religious event in the life of the Brahman, so it is preceded by most elaborate astrological calculations, and accompanied by ceremonials extending over several days. It may be noted here that the 19th lunar mansion (*Mool*), so much dreaded at birth, is considered propitious for this ceremony. At about the age of eight years, and it should certainly be done before he is fifteen, the Brahman boy is invested with the *Janeo* or Bráhmanical cord. The receiving of the *Janeo* is considered the second birth of the Hindu, who is thenceforth called "twice-born." This ceremony has therefore not inappropriately been styled the baptism of the Hindu. Prior to this the lad, though a Bráhman of the Bráhmans by birth, is not a Brahman at all in religion, and his seniors will not eat with him. Not being yet a Brahman the lad may himself eat or do almost anything without prejudice to caste. By this rite however he is admitted into the Brahmanical or sacerdotal order, and, commensurate with the importance of the occasion, is the amount of ceremony used and expenses incurred. The particulars of the investiture are most tedious and need not be related. The *Janeo* itself must only be made by Bráhmans. It consists of three strings or five threads of spun cotton. As much as will wind round the hand ninety-six times is taken, and the three threads twisted together with a spindle; it is then folded into three which are again twisted together; this is a second time folded into three and twisted together; and it is then tied in a knot at each end. The *Janeo* is worn over the left shoulder next the skin, extending

a short way down the right thigh by Bráhmans, Rajpoots and Vaisyas, and should be renewed once a month. For Rajpoots and Vaisyas the thread is wound round the hand only ninety-five and ninety-four times respectively, and there is also some difference in the kind of knot used for their *Janeos*. The Sudra caste do not receive the *Janeo* at all. At the moment of the investiture the officiating priest whispers the *Gayatri* into the ear of the boy. For Bráhmans this is said to be a verse from the *Vedas*—"Let us meditate on the adorable light of the Divine Ruler, may it guide our intellects." The *Gayatris*, used in the investiture of Rajpoots and Vaisyas, are different. The ceremony over, the lad is now a pukka Bráhman, but all is not finished yet. The Prohit takes this opportunity of impressing upon the newly admitted member of the priestly fraternity, the onerous nature of the responsibilities he has incurred, inculcates various precepts for his religious and moral conduct through life, and strongly impresses upon him the necessity for applying himself diligently to learning, as ordered by the *Shastres*. This boy of eight then declares he must repair at once to Benares to commence his studies, and shouldering a banghy laden at one end with five and at the other with three *laddus* (sweetmeats,) and clad in travelling attire, with clogs, &c., pretends to start. On this there is a general outcry. His relations beseech him to remain, holding out various inducements, which, seeing he never intended to go, have the desired effect of arresting his travels. Very early next morning he is initiated into his daily matutinal ceremonies, duties which from that day he can never lay aside.

The expenses attending the investiture of the *Janeo* are enormous, and second only to those at marriage. Five hundred rupees is a common sum, mounting up to thousands according to the ability of the family.

Rajpoots and Vaisyas are not invested with the *Janeo* until their marriage, so that in their case the two ceremonies are combined, and one expenditure suffices for both.

104. Beeah.—The ceremonies which precede and accompany the rite of marriage are even more numerous and elaborate than those which are connected with the investiture of the *Janeo*. Every care is taken and precaution adopted to secure the first negotiations being opened, and subsequent steps taken during propitious conjunctions of the stars. Marriages now-a-days are always contracted within the same castes, that is, Bráhmans with Bráhmans, Rajpoots with Rajpoots, (though in the latter case it is necessary that the parties be of a different *gote* or clan), and so on. The Hindu marriage is purely a matter of business, and has nothing whatever to do with sentiment or personal predilections. To begin with—the principals are only children, and even they have probably never seen each other. The first move is always made by the father of the girl, who when his daughter is about eight years age, and he can afford

to get her married, inquires from his friends, and relations after an eligible lad. Having selected one the father with a friend or two, but always with a barber (*Nae*), proceeds to the lad's village, and sits down by the door of the first Brahman's house they chance to come to. They then begin quietly to institute inquiries about the lad, and to devise some method of getting an introduction. This being arranged a friend is despatched to the lad's father, who then takes his son, dressed in his best attire, for the inspection of the girl's father. If approved of, a *Pundit* is then engaged to scrutinise the boy's *Janam-patree*, and the constellations are again consulted to decide whether the lunar mansions, in which both parties were born, combine propitiously. If the combinations are favorable, a *tilak* or *teeka* is affixed to the lad's forehead, and the negotiations are continued, but if not, further proceedings are at once stopped. The subsequent progress of the negotiations is attended at every turn with more references to the stars, and each unfavorable hit has to be propitiated by tips to the *Pundit*.

105. All Hindu marriages must take place in one of the following months :—

January	...	...	Mag.
February	...	...	Phagoon.
April	...	...	Baesakh.
May	...	...	Jeyt.
June	...	...	Asarh.

A selection from these months is made by another consultation with the stars, and is a matter of some moment, for a marriage in January is said to bring a wealthy wife ; in February, a good manager ; April and May yield affectionate and dutiful wives ; whilst June marriages are prolific.

106. The question of dowry (*dahez*) is next gone into, and then the girl's father gives the lad one rupee as an earnest or pledge, and so completes the ceremony of betrothal or *barreecha*. Next day he returns home, and announces the betrothal of his daughter to all their friends. Subsequently, on a day previously appointed the girl's father sends the family barber with a document called *lagan*, which is accompanied with presents of coins, betelnut, cocoanuts, &c., to the boy's father who receives him with great honor. Sometimes a portion of the stipulated dowry accompanies the *lagan*. On this occasion, the actual day on which the marriage (*beeah*) is to take place, is settled, and the barber then returns home. Invitations to bring their retinues (*Sowaree*) with them, so as to help to swell the pomp of the occasion, and join in the *barat* or marriage procession.

107. On the morning when the bridegroom starts for the bride's house, he is dressed with much fuss in yellow by a *durzee* (tailor); borrowed jewels, if he has not sufficient of his own, are put on him by a *sonar* (goldsmith) ; he is crowned with a wreath of flowers by a *malee* (gardener) ; his feet are dyed red by a *nai* (barber) ; and when

all these have been duly tipped, he mounts his palkee with his younger brother or cousin as his best man. Before starting on his journey however he is taken the round of the village shrines, preceded by his mother and other relatives, and at each of them he makes an offering. He is finally deposited at the village well, where a very characteristic scene is transacted. The bridegroom's mother sits down at the edge of the well, with one leg hanging down, and threatens to throw herself in unless her son restores to her the value of the milk with which she nourished him, and of the care and affection she bestowed upon him. Her son thereupon seizes her leg, and swearing eternal devotion to his mother implores her for his sake to prolong her life, which she of course consents to do. By this time the *barat* or marriage procession has formed ; but he is not quite off yet, for before leaving the village the palkee bearers put down their burden and demand *bakshees*, and it is not until they too are satisfied that he gets fairly on the road to his wife's home. It is generally arranged that the marriage procession should reach its destination in the evening, and a barber is always sent on in the morning to prepare the bride's party for its arrival. On the approach of the bridegroom a procession is arranged, which issues forth with music and torches to meet the *barat*. Loud and joyful are the salutations and greetings that pass between the two parties, and then the bridegroom is eagerly escorted to the bride's house, at the door of which he is met by all the bride's relations, and a *pooja* takes place at which presents are made all round, and money is scrambled for by the crowd outside. The bridegroom is then taken back in his palkee to where his camp is pitched, generally in a *tope* of trees close by. After man and beast have had refreshment, the bride's priest or *Prohit* arrives with various articles for *pooja*, and two *Janeos* or Bráhmanical cords. After some ceremonies the bridegroom's *Janeo* is taken off, and is replaced by the two new ones, one in room of that taken off, and the other the "*Shadee Janeo*," hereafter always worn. Hence it is, that though at the investiture of the *Janeo* only one cord is assumed, every married Bráhman has two. Later in the night the bridegroom's father, *Pundit* and *Nae*, are escorted by their friends to the bride's house, to present the bridal presents, which is done in the *Angaun* or court yard. The bride tries them on, and then takes them off again to be scrutinised by the ladies. She then retires, and the bridegroom's party returning to camp they all go to rest. But suddenly, the bride's *Pundit* who has been watching, announces that the appointed star has appeared on the horizon, and that the hour for the wedding has arrived. All are woken up, the lad and his best man are dressed and adorned, both are placed in the palkee, and the procession starts once more for the bride's house, where they dismount and are received with great ceremony in the court-yard. Here the bride joins the party and is seated in front of her parents, whilst the bridegroom sits close by and opposite to her. They then both assume their bridal garments of yellow, and the ceremony of *pan-grahan*, *kanya-dan* "joining of hands" or *gilt of the virgin*," commences. The girl's father puts some flowers, any fruit taht is in season, and a little grain (emblems of domestic comforts)

into the bridegroom's right hand, and then he puts his daughter's right hand on top of all. Taking next a ball of *atta*, in which has been placed some gold, silver, a pearl, coral and some copper, (emblems of the priceless gift he is bestowing,) he places it in the bride's right hand still resting on the bridegroom's, the while his *Prohit* is repeating verses, the gist of which is that he bestows his daughter and all her belongings upon the bridegroom. The bridegroom then takes the ball of *atta* from her in token of his acceptance of the trust. The bride's father next presents a cow and other gifts according to his means to the bridegroom, and then their friends are admitted, who offer congratulations, and presents often of great value, to the lucky youth. One more essential ceremonial, *agni pooja*, still remains to complete the rite. A fire of mango wood is lighted with much ceremony, and the young couple are made to stand up facing the east and are tied together by their garments.

They then circumambulate the fire once, the girl leading the way, and the females of the house chaunting—

*Ek ek bhaouree !
Bap ! abhi tumharee !
There's one only round yet !
Father ! she is thine yet !*

After an interval they make another circuit round the fire, and then another, until they have completed six, appropriate couplets being sung the while. Then they make a seventh and last revolution; this time round each other by a mutual change of position and seat, which completes the marriage; and the circuit song announces the fact—

*Sat sat bhaouree !
Bap ! ab hooee parace !
Seven times they've been round together !
Father ! she is now another's !*

The ceremony concludes by the *Prohit* addressing an appropriate exhortation to the newly married couple, and directing them to make solemn affirmation to each other of their readiness to discharge their respective duties. This done the bride retires again to her own apartments, and the bridegroom to his camp. Three more days are spent in feasting and rejoicing, settling of the dowry accounts, and a general mulcting of the bride's father; on the fourth day, all being ready, the bride is sent for, and a start homewards is made, amidst sore lamentations and clinging embraces. On arrival at the husband's house a halt has to be made at the door, until the *Prohit* declares the hour propitious for the young couple to enter. The child-wife remains only a few days on this occasion in her husband's house, and then returns to her parents, with whom she remains sometimes as long as five years before the husband comes to take her home for good.

This is called the *Gaona* or home-taking, and is effected with very much less fuss and ceremony than the marriage, though the stars and *Pundits* are consulted here also. The husband simply pays a visit of three or four days to his wife's family, during which there is rejoicing and feasting. The final leave is then taken, and the husband returns home with his wife, this time to commence life together.

108. When the death of a Hindu is approaching a *Pundit* is summoned. The court-yard or a spot immediately outside the door is *leaped* afresh and, a layer of *koosa* grass being made, the sick man with his bedding is laid upon it. A few drops of Ganges water (*Ganga jal*) are put in his mouth, and the ceremony of presenting a Bráhman with a cow (*gaudam*) as a propitiation, is gone through. The animal is brought close to the dying man, and its tail together with a rupee is put into his hand. He *poojas* the feet of the Bráhman and presents him with the cow. This done, the sick man, now sure of salvation, closes his eyes and breathes his last in peace.

When death has occurred, the body is covered with a white cloth, and as soon as possible is carried on a *charpaie* or other bier to the burning place, which if practicable is always near the bank of a river. These funeral rites are always conducted by a Maha-Bráhman, a sect occupying a low position in the scale of Bráhmans, and whose particular calling it is to superintend funeral obsequies. On the way to the funeral pile the mourners chant various verses, calling out "Seeta Ram, Ram Ram, Sat;" arrived at the spot, the body is washed, nudity being carefully avoided. Clean clothes and, if a Brahman, a new *janeo* are put on, and then the body is laid on the funeral pile by five males with its head to the north. If a man the face is turned downwards, if a woman the reverse. The nearest relative (*Dagha*) of the deceased places a small bit of gold, a *toolsee* leaf, and a little Ganges water in the mouth of the corpse, and a quantity of *ghee* all about it, to expedite the burning. The *Dagha* then receives a wisp of straw from the Bráhman, lights it, walks round the pile three times from the left, thrusting the burning straw each time into the face of the corpse, and finally lights the pile in the direction of the head if the deceased be a male, and in that of the feet if a female. All present must remain until the head has burst open, and the *Dagha* or some one deputed by him frequently expedites this by smashing it with a stick. When the body is quite consumed the ashes are thrown into the river if there be one handy. An earthen vessel of water is finally broken over the spot where cremation took place, amid cries of "Harree Bol, Harree Bol!" and with this the funeral ceremony ends. If there be no river at hand the ashes are collected, and when an opportunity offers are sent by the hands of relatives and friends to be thrown into the sacred Ganges. On conclusion of the funeral rites, the mourners adjourn to the nearest water, where they bathe, and placing some blades of *Koosa* grass on the water's edge pour a libation of water and *til* over it, a ceremony called *Tilangan*. This is repeated by the members of the

deceased's family for ten days, during which time they are not allowed to shave, wear shoes, or eat cooked food; whilst the chief mourner, being considered "impure," is not permitted to touch any one, or to sleep off the ground. On the eleventh day the Maha Bráhman reappears, and performs various rites and *Poojas*, at the conclusion of which he is ready to receive the offerings of the family in return for his services. These *Poojas* consist of certain forms, with *Pindhs* of rice, *ghee* and sugar, which in the course of the ceremony are scattered about for the spirit of the deceased to pick up. A vessel of water and a lamp are also suspended in the branches of a *Pipal* tree, the one to slake the thirst of the deceased, the other to light him on his way through the dark passages to the judgment seat of *Yama*. It is not until the thirteenth day, when the family *Prohit* comes and performs some final ceremonies, that the spirit of the deceased is supposed to wend its way finally to another world, and the *Daghia* be considered once more purified. On this occasion at least thirteen Bráhmans have to be fed, besides being given each a day's provisions. On the last day of the mourning all within the seven nearest degrees of relationship to the deceased shave their heads. Every month at the dark moon, "*Amawas*," the *Prohit* and the chief mourner perform certain *Shradh* rites, and on the first anniversary of the death, the *Prohit* as well as other Bráhmans and friends assemble, and the *Pindh Pooja* is repeated. In the case of a female this ceremony takes place after six, instead of twelve months. On this occasion the Bráhmans and friends are all feasted, and unless this practice is duly observed, the soul of the deceased is said to obtain no rest. It is at this ceremonial, called the *Shradh*, that the *Daghia* or chief mourner makes an offering of a male calf to the names of his departed relative. He washes the animal, brands it on the flank, with the impression of a trident, the badge of *Vishnu*, and then liberates it to wander about the country in the familiar form of a Brahmanee bull.

109. The foregoing ceremonials at death are common to all castes of Hindus, but there are certain cases in which even Bráhmans and Rajpoots do not comply with them. If a Bráhman lad dies before he has been invested with the Bráhmanical cord (*Janeo*), instead of being burnt, his body is buried. In the case of a Rajpoot, as the *Janeo* is not assumed until marriage, it is considered sufficient for the cremation of the body, that the lad should have undergone the rite of *Mooran* or "head-shaving." If again the deceased child be under a month old, the body is at once buried as near the spot of its birth as possible, and not unfrequently in the court-yard of the father's house. In this case the period of mourning is only one day. In like manner all Hindu girls are buried, who die whilst they are yet *Kanyas*, that is, before they have arrived at a marriageable age.

110. There are also some sects of devotees and religious mendicants who are of no caste, or rather are derived from all the castes, who bury their dead. The most common of these orders are the *Gosains*,

Jogis, and Sanyasis. The latter order never cook food nor even light a lamp, for fear of destroying insects that might fly into the flame. For the same reason they do not burn their dead.

111. It has been seen that the cow is an animal especially venerated by all classes of Hindus. Tradition has it that to *Kasyah*, the grandson of Brahma, was entrusted the creation of the animal world. On completion of his task he pronounced the cow to be at the head of all beasts whatsoever, assigning different parts of his body to be residence of various deities. Hence the cow has come to be regarded by devout Hindus as not only the receptacle, but the representative of deities in one, and therefore naturally an object of very great veneration. There are two ceremonics connected with the worship of the cow.

(1) "*Gao-Poojah*" is practised by the Hindu, when he has any special favor to ask, and is the worship, pure and simple, of the cow itself. The head of the cow is devoutly bathed, a little Ganges water is poured upon it, and then a *teeka* or wafer, composed of turmeric and other spices, is put upon its forehead. An offering of rice is next made, and a little of it is sprinkled over the cow's head. The animal is then crowned with a chaplet of flowers, and is incensed with the smoke of a fire made with aromatic woods. A feed of the best provender having been placed before her, the devotee proceeds to prefer his petition. If the cow takes kindly to its food, he departs with the full assurance that his prayers will be granted.

(2) *Gao-dan*, or "gift of a cow," is a ceremony at which a propitiatory offering of a cow is made to a Bráhman, and may be practised at any time. The ceremony is considered essential immediately before death, and without it no Hindu can hope to get across the Styx. In the *Mahabharata* it is related that Bráhman after creating the world, constructed a most magnificent judgment-hall where the souls of Hindus were to be arraigned for judgment, but as the giants *Gandharvas* or "Centaurs," were in the habit of pouncing upon everything worth having, he caused an immense river, *Viotareni*, 450 *kos* broad, to flow round the building, across which it became necessary that all deceased Hindus should swim to arrive at his judgment seat. It was to comfort the wretched Hindu, with this Herculean task before him, that the Bráhmans devised the ceremony of *Gao-dan*. The rite consists of the suppliant presenting his Bráhman with a cow, and in return is assured by him that the beast will meet him on the banks of the dreaded river, across which it will safely convey him, whilst he holds on to the tail of the sacred animal.

(To be continued.)

IV.

LECTURE.

THE TELEPHONE AND ITS APPLICATION TO MILITARY AND NAVAL PURPOSES,

By W. H. Preece, Vice-President Society Telegraph Engineers; and Member Institution Civil Engineers, taken from the Journal of the Royal United Service Institution.

No one can deny the enormous value of the electric telegraph for warlike purposes. It has well nigh revolutionized the art of war. It has become a great weapon of offence, as well as a great shield of defence. Operations that were a few years ago impossible are now regarded as essential. The strategist in his office can now grasp a continent in his combinations. The actual manœuvres of armies can be controlled and directed like the toy figures of the game of Kriegs-spiel. The maintenance of the lines of telegraph to an army in the field is as important as that of the more material lines of communication. The telegraph, in fact, has become a necessity of the age. No war could now be undertaken without its aid.

But it is not only in annihilating space, and bringing within the mental view of the master mind a dozen armies and a million men, that telegraphy is so valuable ; it is in the rapid communication of intelligence and orders to and from the Commanding Officers of each limb of each army, however small ; it is in connecting together, in immediate communication, the different parts of a fortress or an entrenched camp, however much they may be scattered ; it is in maintaining an uninterrupted connection between all parts of a besieging force, however extensive may be the lines of circumvallation, that it is so serviceable. It would have been impossible to have kept on the seiges of Paris and Metz without it. Indeed, it has a civilizing influence, for it not only tends to shorten the duration of war, but to diminish the loss of life, by rendering possible those combinations which, in the cases of Sedan as well as of Metz, swallowed up temporarily in prison two great armies. Moreover, it facilitates the supply of food, it regulates the traffic on railways, it aids the transport home of the sick and wounded, it satisfies the craving for news, and it alleviates anxiety at home. It is well known that the Germans, guided by their experience of 1866, commenced the war of 1870 with a very well organized and extensive system of telegraphs for field service, but that the French had a system wanting in efficient organization and miserably deficient in men and material. We know little of the present Russian system, excepting the fact that by its aid the army around Plevna maintained its bear-like hug on the doomed fortress, and enabled it to thwart, with overpowering force, the tiger-like rush of Osman Pasha.

So important is efficient telegraphy now considered for the British Army that 6 officers and 160 men are being trained and maintained in efficiency in the British postal telegraph system, so as to be available in time of war. They are, in fact, daily rehearsing that part which they may have some day to perform in earnest in an enemy's country. Moreover, we have our field telegraphs in constant training at Aldershot, Chatham, and elsewhere, though it is very doubtful whether this department has been nearly sufficiently developed, or is anything like being properly equipped, for such an army as ours. However, I am here, not to criticise or describe the equipment of our military telegraphic system but to describe an apparatus which may prove a most useful and valuable adjunct to the already well matured system of waggons and barrows and cables in actual use. I must draw a distinction between the permanent telegraphic system of the country occupied by an army, the semi-permanent lines of the telegraphy which connect head-quarters, as it advances, with this system, and the "flying line" or temporary system of field telegraphs which follows the movements of the various corps in the field, and maintains their communication with head-quarters. The first two must necessarily be worked on the ordinary telegraphic system in use, maintained by technical skilled labour, and worked by well trained, experienced telegraphists. The flying line need not necessarily be so manipulated. There is also the visual system, intended for outpost and reconnoitring duties, and which necessarily must be continued under circumstances which render field telegraphs impractical. I do not intend to refer to this admirable system.

At present, the apparatus in use for field telegraphy is the ordinary Morse recording apparatus, which records its messages in the ordinary dot and dash alphabet, understood only by the initiated, supplemented by a sounding instrument, which appeals, by a similar foreign language, to the ear. Thus, to convey intelligence from one point to another, a message has to be written down on paper, it has then to be translated by a telegrapher into the *Morse* language, which has to be re-translated at the distant end into the ordinary written language, and then read by the recipient. These operations are subject to error, and have not secured faith in their reliability. Is there any Commanding Officer here present who would not wish such an uncertain agent in a very warm place? Those who were present at the Autumn Manceuvres on Salisbury Plains now how to value its services. It is unquestionable that the telegraph has not inspired confidence, and this is due as much to its natural uncertainty as to the want of knowledge of the tool that is used. Accuracy in the transmission of orders is the *sine quâ non* of a military telegraph. We know of one great disaster that arose from a mistake. "Some one has blundered." It was the very last thing determined upon in our late Ashantee War, and the rapidly collected materials drawn from the Post Office stores were despatched at the last moment, by passenger train, and stowed in the officers' baggage room. Yet we have the authority of Sir Lintorn Simmons for saying that the operations in that war could not have

been carried on as they were without its assistance, and that it was productive of very great economy to this country by shortening the expedition and enabling the greatest amount of benefit to be derived from the materials and means that were placed at the disposal of the General in command.

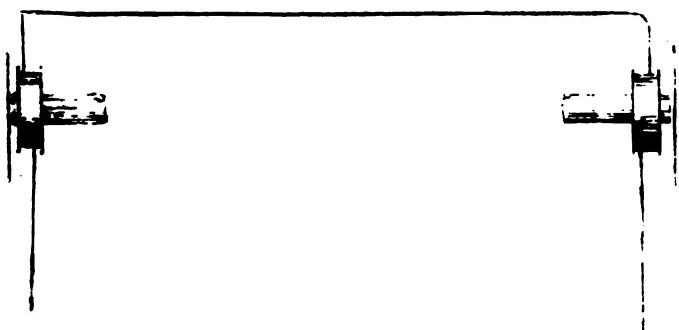
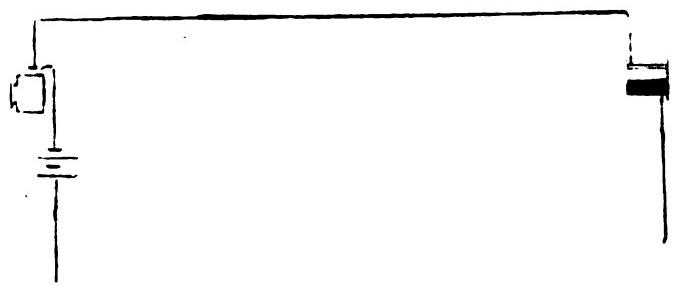
Now, the telephone, if it prove a practical instrument, will place in the hand of every officer an instrument which will transfer the actual words and tones of his own voice to his correspondent at any reasonable distance. I have spoken distinctly, at various distances up to ninety miles ; last week I spoke from Holyhead with my friends in Dublin, through the cable joining those two places, and I have been able to recognise, with absolute certainty the voices of different people at sixty-seven miles. It will solve the moot question as to the best form of instrument for military telegraphs, about which there is much diversity of opinion.

How is it that the human voice itself can be reproduced at such distances ? When I strike a bell, blow a whistle, sound a reed, clap my hands, or speak to you, how is it that these different operations are conveyed through your ears so as to produce on the brain that sensation which is called *sound* ? The air itself, in which we breathe and move and have our being, is a highly elastic medium, which readily receives and transmits any motion imparted to it. When I clap my hands, I suddenly throw this air into motion, a wave is formed, just like a stone thrown into water generates a wave that circles round and round, striking and enveloping everything in its course. This air-wave likewise envelops everything in its course and impinging upon the tympana of your ears, it there affects the nerves in such a way as to convey to the brain that sensation which education has taught us to be that sound due to the clapping of hands. Sound is therefore simply the undulations of the air ; but there is sound and sound. I shake this box of nails ; it makes a most disagreeable noise. I blow this reed ; it makes a soft musical tone. Why have we in the one case *noise* and in the other *music* ? In the one case the waves follow each other in irregular spasmodic fashion, shivering the drum of the ear with unpleasant shocks ; in the other case the waves follow each other regularly, periodically, and rhythmically, blending together on the drum of the ear with pleasant sensations. Let us ignore noise, and confine ourselves to this musical instrument. I blow a note. If it were possible to illuminate a tube of air between the mouth of this instrument and any one of your ears you would see this air chased and moulded into the most beautiful and regular undulations ; not rises and falls, like the vertical waves of the sea, but condensations and rarefactions—close order and open order—more like a field of barley in autumn time responding to the motion of a gentle breeze. If we conceive a line of particles to be arranged along this tube, like a long file of men or a row of marbles, then if each particle takes an excursion to and fro for the same distance (the same *amplitude*), however small, then

if the motion of each particle be successive, and not simultaneous, the line will be excited into waves or sonorous vibrations, as shown in Fig. 1.

Now, let us fix our attention upon this musical instrument and this supposititious tube of air. I can produce various *notes*. One note differs from another note only in the number of waves or sonorous vibrations produced per second. Middle C of the piano makes 264 of these vibrations, E 330, F 352, A 440, and the octave to C 528 per second. The lowest note that can be heard by the human ear is 16 complete vibrations per second; the highest, 38,000. The range of the human voice is between 65 and 1,044 sonorous vibrations per second. Whenever and however we produce air vibrations, pursuing each other regularly between these two limits, we have *notes*. And one note differs from another note in its *pitch*, which is the number of its sonorous vibrations per second. But these notes may be soft and gentle or rough and loud. Hence notes differ, not only in their *pitch*, but they differ in their *loudness*. Loudness depends upon the energy of the source of sound and upon the amplitude of the consequent vibrations of the particles of air. If I blow gently, the excursion to and fro is small. If I blow fiercely, and the excursion to and fro is great. The former undulations strike the ear gently, and the sensation is low; the latter strike it fiercely, and the sensation is loud. Again, I take three or four different instruments and I sound the same note on each with the same force. The pitch is the same, the loudness is the same, but there is no mistaking their difference. This difference is called their quality, clang-tint, or *timbre*. Now, what causes this clang-tint? I must beg your attention here, for here lies the secret of the new articulating telephone. This clang-tint is due to the *form* of the wave of air. It is very difficult to conceive a difference in the form of a wave of air. It is simple enough when we regard water. We see this for ourselves upon the surface of a pond or of the mighty deep. But the difference of an air-wave lies, not in its geometrical form so much as in the rate of motion of its different particles. I wave my hand backwards and forwards regularly or irregularly. I can make it move at any given rate, at any given time, and, though the number of excursions and the amplitude of excursion to and fro per unit of time may be the same, I can vary the form or rate of excursion at will. This produces difference of quality, and this is why middle C, sounded on a piano, on a harp, on a bugle, or by the voice is the same note, but differing so much in clang-tint. It is impossible to picture in the mind the beauty and minuteness of the sound-waves. The ear, though approached by a channel the diameter of only a quill, will receive the vibrations from a hundred voices and instruments and can separate each by attention. Hence we arrive at our first proposition, that sound is due to the undulations of the air, and that, as these undulations vary in number per second, in amplitude, and in form, so we have noise or music, varying in pitch, in loudness, and in clang-tint.

We have now to consider how we can catch up, as it were,



these sounds, and convey them into something else. It is said that Lablache could sound a note so deep and loud that he could crack a tumbler. Whenever anyone sings in a room, something can be always heard to rattle. If you open the piano, and sound the vowels on the middle notes, you will hear the piano repeat them. Hence we learn that the air vibrations can be imparted to other grosser matter in their path. I hold before my mouth this disc of parchment—a small drum-head. It responds to the tones of my voice. I can make this evident to you. It is so constructed that it makes and breaks an electric current every time it vibrates. This electric current operates as an electro-magnet. The electro-magnet actuates an armature. If the motions of this armature are of the same number as the disc, we shall have the note repeated. There you are. Every note I direct upon the disc is repeated by the magnet. But I cannot vary this note. Whether I shout or whether I hum; whether I sound the note upon an instrument or upon a tuning-fork, the note given out by the magnet is the same. It varies only in pitch, and not in loudness or in clang-tint. This is the first telephone ever made, that of Riess of Friedericksorff, and it is illustrated in Fig. 2.

Now I must make a temporary diversion in to the realms of electricity.

There are many ways of producing electricity. We have just used a battery where the electricity was produced by the chemical decomposition or combustion of zinc, just as heat is produced by the chemical decomposition or combustion of coal. We can produce it by friction or by heat, but one very common mode is to produce it by the motion of a coil of wire in the neighbourhood of a permanent magnet or *vice versa*, by the motion of a magnet near a coil of wire. This is how an ordinary shocking coil is made. Here is a large permanent magnet and here is a coil of wire. I suddenly move that coil of wire, a current is produced, and I have rung a bell. But even if the magnet be fixed and the coil be fixed, any variation in the strength of the magnetism about that coil will produce a current of electricity in that coil. Thus if in front of that magnet which has a coil fixed on its pole, I move this mass of iron, a current will be produced in that coil. And for every motion of that piece of iron I can produce a current of electricity. But more than that, the current will rise and fall in intensity exactly as the iron moves. Hence the currents of electricity produced in that coil will vary exactly as the motion of that mass of iron. Now suppose that mass of iron to be a thin disc like our parchment drum-head, but of iron; and I speak to that disc. We know that that disc will respond to my voice. Whatever words I sound, however I vary them in pitch and loudness and quality, that disc will vibrate in number, amplitude and form, exactly responsive, and currents of electricity will be produced in that coil which will vary exactly in number, strength, and form, with the words I utter. Let this coil be connected with an exactly similar coil at some distance off, and let the currents in the first coil circulate through the second, then if the second coil surround a mass of soft iron, these currents will induce magnetism in the soft

iron, and the strength of this magnetism will vary exactly with the currents producing it. If in front of this iron coil we plant an iron disc exactly like the first one, then every time the iron coil is magnetised it will attract the iron disc, and will cause it to move. Now the motions of this disc will vary exactly with the variation of the magnetism of the coil. The magnetism of the coil will vary exactly with the strength of the currents producing it. The strength of the currents will vary exactly with the motions of the first disc, and hence the motions of the second disc will vary exactly with those of the first. In fact they will be an exact reproduction of the first. Hence with whatever note the first disc vibrates, however much it varies in pitch and loudness and quality, the second disc reproduces those vibrations exactly. Those vibrations are imparted to the air and thus we have sounds reproduced with all the delicate variations of the human voice. The sound of the human voice is transmitted into electric currents, and these currents again produce sonorous vibrations which exactly reproduce the human voice. Indeed, there is no sound which the human lips can produce or the human ear can detect, which cannot be reproduced on the telephone, and where it not for practical difficulties, sounds that "mellow to sadness now madden to crime," could be as easily transmitted from the east to the west as from this hall to the room above. In fact, to "waft a sigh from Indus to the Pole," is removed from the poet's dreamland, and has become as much a matter of fact as "extracting sunbeams from cucumbers."

But not yet—the vapourings of imaginative newspaper correspondents are not yet practical. The articulating telephone itself is an extremely delicate apparatus. It is subject to interference by every waif and stray current that wanders into a telegraph wire, and their name is legion. Atmospheric electricity, earth currents and the influence of neighbouring wires, all generate these troublesome wanderers and interfere with its action. So that on existing lines of telegraph, except for short distances, it has not yet been found useful or even practical, but on short independent isolated lines like those used for field telegraphs, it is a thorough practical instrument, and well deserving the fullest trial that actual service can give it.

It works to perfection in mines. There it is not only free from all extraneous troubles, but the silence of the grave facilitates the operation of its "still small voice." It is not even necessary in such place to put it to the ear. Wherever, however, extraneous sounds intervene not only is it necessary to put it close to the ear, but to effectively shut out all disturbing elements, two telephones are used, one to each ear. A bi-aural stethoscope applied to it is also found an useful adjunct. By its means reading is very simple. How far it could be heard amidst the roar of artillery and the din of battle remains to be tried.

What it does is this: it transmits to a distance far beyond the reach of the ear, or of the eye, the words of command, the tones of voice.

the distinct and unmistakeable articulation of the general as well as of the private. Such an apparatus must be valuable for military purposes,

How far it can be utilized for naval purposes remains to be seen. Wherever a wire can extend there can the voice be sent. In communicating between the bridge and the wheel, between the turret and the engine room, between the look-out and the officer of the watch, it ought to be useful. For diving operations it is invaluable. In torpedo operations and range-finding it may prove useful.

But at present it is a mere child. It has startled us all by its novelty, its beauty, and its simplicity. Time alone is required to establish its utility. Probably no instrument that has ever been devised has created more sensation, or has attracted so much attention, and I feel highly honoured in having been allowed to bring before such a distinguished audience the incomparable invention of Alexander Graham Bell.

V.

THE TELEPHONE,

UTILIZED ON OUTPOST DUTY.

Translated from the "Militär Wochenblatt," No. 3, 9th January 1873.

In the year 1873, the greatest interest was aroused in Military and special circles by the invention, in France, of M. Trouve's portable field telegraph; a similar instrument constructed in Berlin, and used with good effect at several of the great Military manœuvres, met with an equal amount of attention; but its complex manufacture, costliness and want of general interest prevented its having any wide-spread popularity.

It is but lately that we have been introduced to the telephone and its application, and it is impossible as yet to see to what proportions this magnificent invention will expand; but its value for purely military purposes may be estimated to a certain extent.

Without any battery, Morse apparatus, galvanometer, &c., or even special knowledge on the part of the operator we can communicate rapidly within any distance likely to be required on outpost duty. I will relate in a few words my practical experience of the subject:—

In an old knapsack I fixed a roller or cylinder a foot long, with its ends let into the sides of the knapsack so as to allow it to revolve freely round its axis; on the cylinder was reeled 320 metres of thin line; on the right side of the knapsack was a wooden handle or winch, by means of which the line was worked. With this remarkably cheap and simple apparatus, carried by a smart soldier of my company, I sallied forth on the morning of the 18th of December, with some of the older soldiers, to practice some field manœuvres. I took particular care to carry the telephones myself, one in each pocket of my great coat, in order that no man's attention might be distracted from manœuvres by having charge of such curious machines: so that there were two fusileers, who carried each in his knapsack a great coat and nothing more.

Arrived on the ground, picquets, double sentries and a detached Non-Commissioned Officer's post were established, to try by which method messages could be sent quicker on outpost duty, by telegraph or by telephone. A fusileer with the knapsack, containing the line now received orders to advance from the piquet to the detached post; the cable reeled merrily off, and within 3 minutes communication was established with the detached post, distant 400 paces.

I now by means of the connecting screws placed the two telephones made by Siemens and Halske of Berlin in contact. The thermometer marked 3° below Zero, and a strong wind was blowing, and the two fusileers above mentioned, having been under the delusion that the great coats they carried were for their own special protection against wind and weather, looked a little disappointed on seeing one coat sent off to the detached post, and the other appropriated by the officer of the piquet, to facilitate the hearing of the messages. By means of them the waves of sound were most effectually concentrated, and in spite of the strong wind every word was heard distinctly. As a warning that a message by telephone was about to be sent, the diphthong œ (Doppelvokal ö) was spoken with a strong voice into the telephone and was distinctly heard by the men of the piquet, who were standing 6 paces off. The answer "here" was given to show that the receiver was all attention, and the message was then sent. The great coats not only served as a protection against wind and disturbing influences from without, but also to a great extent prevented persons standing from hearing the messages sent, which must necessarily be given into the telephone in a loud tone of voice.

After several successful trials the line was wound up by means of the handle in 6 minutes; so long a time being required because at two places where roads crossed it had been buried some inches underground.

A further trial, connecting a double post, proved that messages were conveyed between posts by telephone with as much certainty as if sent in the usual way by messengers.

(Translated by)

R. ELIAS, *Captain,*

59th Regiment.

VI.

PICKET LAMP,

DESIGNED BY MAJOR FRANK JAMES, BOMBAY STAFF CORPS.

Passed Instructor in Military Signaling and Electric Telegraphy.

1. The Picket Lamp, as its name implies, is suggested for general adoption with troops in the field, either in Camp, on the March, or on Picket and Outpost duty in the immediate vicinity of the enemy.

Its name.

Its uses

2. It is proposed that one Picket Lamp be issued as part of the field equipment of each Troop or Company in the Service.

As an article of field equipment.

3. Although designed principally as a *Signaling* apparatus, it has various other uses which are slightly indicated in the following pages, and Engineers and officers accustomed to the management at night of large working parties drawn generally from the Infantry of the Line, will readily conceive occasions when

As a signaling apparatus.

For use with working parties at night.

As dark lanterns.

Coloured lights or numbers.

the presence with the troops of a number of dark lanterns of uniform pattern, disclosing, when required, coloured lights, or numbers, would be of immense advantage, under some properly organised system, in obviating the confusion so liable to occur in work carried on during hours of darkness.

4. In taking up an alignment or position, in occupying an encampment, in the movement generally of large bodies of troops at night, as well as in the police and sanitary arrangements of Camps, it requires no fertile imagination to mention innumerable ways in which the Troop or

In movements of troops at night.

In sanitary and police arrangements of Camp.

Company Picket Lamps, capable of showing either a bright letter or number, or a red, green, or white light, in either one particular direction or on all sides, may, under some system, easily organised to meet local requirements, be of very considerable advantage and use.

5. To take the case alone of an encampment in the immediate vicinity of an enemy, how great would be the advantage, when each and every outlying Picket was in constant and direct communication with camp by a ray of light which

For holding constant communications with Pickets & Outposts.

could by no possible means be seen by the enemy. It may be argued that the enemy could nevertheless see the outward signals from Camp and thus acquire information as to the size, position, &c., of the encampment—*No outward signals need necessarily be made by lights*, however, it is not within the scope of this short descriptive pamphlet to enter into details on such points, due caution would, of course be used in the management of lights within the view of the enemy and signalers will at once understand that it would be quite unnecessary for the Camp or inlying Pickets to keep their lights uncovered, the tin slips,

Can be instantly converted below mentioned, effectually convert the
into Dark Lanterns. lamps pointing toward the enemy into dark-lanterns and these slips are only removed for a few seconds, perhaps once or twice an hour, to answer some signal from the Out-Pickets. These very occasional and intermittent flickers would give the most intelligent enemy a decidedly scant opportunity of gaining information, even supposing (a very unlikely circumstance) that he was so close as to be within signal range of the *in* lying Pickets or Camp itself.

6. As a *signaling* apparatus the Picket Lamp is constructed for Morse's signals in general use at present throughout the Army, it has a range of four miles when read by the naked eye, a distance ample for all purposes of minor tactics, and a speed of about twelve words a minute.

As a signaling apparatus. For the Morse signals. Its range. Speed.

7. It makes no pretence to compete in penetrating power with Lime or Electric Lights which, with all their costly, cumbersome, and intricate requirements are more adapted for use solely at permanently fixed signal stations, and even there only by men specially trained to their care and management, where as the Picket Lamp can be managed and used by any Soldier who has learned the Morse's alphabet, and has sufficient care and intelligence to trim and light a common stable lantern. It is adapted to satisfy a want now much felt in the British Army, for, at the present time, there is no night signaling apparatus whatever, for rough and ready use by the general mass of trained soldier Signalers, between the expensive Lime Light, with its range of twenty-five miles, and the almost useless little bull's-eye hand lamp with its one mile range and clattering lever in shutter that can be read almost as far by *sound* as sight, and with which a speed of six words a minute would be considered good signaling.

It satisfies a present want. Adapted to rough usage.

8. In designing the Picket Lamp any approach to intricacy has been carefully avoided.

9. The body of the Lamp, Fig 1, it will be perceived is a simple

The body.

The glasses moveable.

four sided lantern, the only peculiarity in which is that the glasses are moveable, so that, when any glass is broken, another can immediately be slipped into the groove, &c. a. Fig. 1, made for that purpose, or, should occasion require it, such for instance, as the

"picking up" a signal station located at some unknown spot amid the thousand flickering lights of a large town or village, red, or green glasses may be inserted in either side, or tin slips

Block numbers or letters.

be introduced, or again, when in the immediate vicinity of the enemy,

Tin slides to convert it into
a dark-lantern.

showing large block numbers or letters may be introduced, or again, when in the immediate vicinity of the enemy, the lamp may be at once converted into a perfectly dark lantern, or may be made through its light in one direction only by using squares

of block tin which are kept for this purpose in the case d Fig 5, containing the spare glasses.

10. The Picket Lamp is constructed to burn the common vegetable oils, for mineral oils, though giving a

To burn common oil.

superior light, are troublesome and dangerous in transport, not everywhere obtainable, not so easily managed by the untrained soldier, and moreover, necessitate

Requires no chimney.

some kind of chimney an objection in a lamp for rough and ready usage on picket and outpost duty. Should however

Can burn rock oils if re-
quired.

the adoption of rock oils be considered advisable the shape of the lantern proposed admits of the alteration in the burner at no additional cost or alteration to the present design.

11. A constant oil supply, to last twelve hours, is arranged by

Oil supply for twelve hours.

The reservoir.

Oil not liable to freeze.

means of the old plan of fountain reservoir, which forms the back of the lamp, Fig. 1. b. It may be thought, from its position, that the oil in this case is liable to freeze on cold

nights, but this is effectually prevented by the heat conducted to the fountain by copper strips running down through the wick holder. A bag of ice applied as a test to the back of the lamp for an hour was found to have no effect on the light.

12. The two flat wicks of common loose woven cotton, each one

The wicks.

The pricker.

inch broad, are found to require raising and trimming about once in three hours only, and this is managed with an iron pricker, to be

inserted for that purpose in the slots in the sides of the wick-holders, an arrangement found to be perfectly effectual and far simpler than the usual spur wheel and pinion of the ordinary table lamp, which, with rough usage, is liable to get out of order.

13. The *penetrating* power of the Lamp depends entirely on the parabolic reflector; those entrusted with the reflector. handling of the Picket Lamp must be duly impressed with this fact, positive orders are requisite that the reflector is never to be cleaned, or even touched, with other than chamois leather and powder supplied for that purpose. It should be kept at all times free from oil or grease and as bright as a piece of ordinary glass mirror.

14. After experiments extending over three years it has been decided to entirely dispense with all *lenses*, No bull's-eye, or lens necessary. the loss in penetrating power of the absorption of rays in passing through the glass, the great cost, weight, and liability to damage of even moderately good lenses render them less adapted to a rough lamp of this description than a good *parabolic* reflector which is very inexpensive and which, with moderate care, should last for ten years without resilvering.

15. The signaling shutter, or arrangement by which the letters are formed, requires a more detailed notice.

The shutter.

To signal by obscuration.

Two different patterns of shutters are forwarded with the Picket Lamp for approval, they are designed to signal by *obscuration* as this method is now universally accepted by experienced signalers as preferable, for many reasons, to the system of reading by *flashes*, though it may be remarked that, when once Morse's alphabet has been properly acquired, it matters little to the signal reader whether the leaves of his book are black with white letters or white with black letters.

16. Shutter No. 1, Fig 4, is made to fix on in front of the lantern, from which it can be at once detached, from

Shutter No. 1.

How detached.

Its action.

arrangement which, by opening from the centre with a scissor-like motion, gives a sharp defined flash, and, as the key is similar in action to that of a common electric telegraph key, with a play of under half-an-inch, a speed of twelve words a minute can readily be received by a trained signaler with no exertion on the part of the sender.

17. It may be here noticed that Morse's alphabet *cannot* be signalled quickly and sharply by any lever

A *spring* action necessary for proper signaling.

use all over the world is

Can be used for any signaling apparatus.

shutter that falls by its own weight, a return *spring*, as in the electric telegraph key is essential to enable any signaler to form the letters properly. The shutter now proposed may be used not only for any kind and size of signaling lamp, whether oil, lime or electric, but also for all and any kind and size of Heliostat, it is an obvious improvement for instance on the hand-screen attached to Captain Begbie's Heliostat, and it therefore stands as an invention on its own

merits irrespective of the lamp to which it is now attached. Its mechanism Fig 4, is very simple and so strong that it would be a difficult matter to put it out of order; moreover it is *noiseless*, a point of some importance when on picket-duty close to the enemy, for the writer can certify to having heard, and *read by sound*, the click of the key of the old pattern signaling lamp on a still night at a distance of a quarter of a mile, when, from the lamp being turned in the opposite direction, no light was visible.

Weight.
Cost.
ounces and its cost about five shillings.

18. Shutter No. 2, Fig. 3, is made to fit *inside* and in the corner of the Picket Lamp, thus, being more protected, it is less liable to injury than the other pattern; it is equally noiseless and strong, as easily removed, (by simply giving a half-turn to the eccentric nut *a*. Fig 3, with the point of the pricker, from *outside* the lamp, through the small hole made for this purpose,) and is perhaps better adapted to the particular kind of signaling lamp now under consideration. The play of this key is very springy and sharp and it certainly could with advantage be adopted in place of the lever arrangement attached to the lime lamps now in use in the service. Its weight in brass is seven ounces and cost of making a number about four shilling each.

19. The space at the back of the lamp below the oil reservoir has been utilized by placing there a small drawer
Drawer for necessaries. Fig. 1, *d* to contain matches, pricker, scissors, &c., articles necessary to have at all times at hand with Picket Lamp in in the field.

20. The strong ring at the top will be useful to suspend the lamp or to move it from place to place when
The ring. lighted, which may easily be done, even though the cover be considerably heated, by passing a rope's end, or a stick through the said ring.

21. The staple at the back Fig. 1, *f*. will be convenient should it ever be necessary to fix the lamp on the wall
The staple. of a hut or barrack room, for, as the illuminating power of the Picket Lamp will be found
Can, if required, be used as superior to, and not more expensive than the barrack lanterns usually issued to troops on foreign stations, it may at times be advantageous thus to utilise the Company Picket Lamps with a regiment or detachment, on which occasions, of course, the packing case, with its spare glasses, signal shutter, reflector, &c. &c., would be deposited in the store room, and the body is then nothing more than a simple, strong and effective wall-lamp.

22. A grooved case containing the glasses and tin slides is placed inside the packing case Fig. 5, d. where they are secure from injury in traveling and even while the lamp is in use as a signaling apparatus, without moving the lamp or interfering with the signaller, they are easily accessible to the man sitting at the writing ledge d. Fig. 2, (hereafter described) on the opposite side of the lamp to the signaller.

23. The lamp, when not in use, is packed in a common deal-wood case Figs. 2, and 5, in size and shape like that of a hand-sewing-machine, sufficiently strong to stand a fair amount of rough carriage. This case however has been utilised to overcome a difficulty that has long been felt with regard to a *stand* to raise signaling lamps to a convenient height from the ground to meet the hand of the operator when holding the signaling key.

24. The old tripod stand is acknowledged to be cumbersome, expensive and unsteady under the vibration of the key. The arrangement here adopted, it will be perceived meets all the requirements of the case without the necessity of a detached stand and with the addition of little or no weight, the lamp when required for signaling being slid into

The iron legs. From the handle of the packing case. grooves in the lid of its packing case, the iron legs, which form the handle of the box when packed Fig. 2, are now turned down, Fig. 5, and kept in a splayed position on the ground by a leather band, on which, if necessary,

How fixed in position. Adjustment of the direction of the rays. may be placed some stones, earth or sand, and the whole will be found as firm as need be, with the key handle at a convenient height from the ground of three feet. The lamp, having been thus fixed in the right bearing, the correct elevation or depression, necessary to throw the rays in the direction of the distinct station, can be adjusted by raising or lowering the hinged lid of the packing case Fig. 5, according to a sight taken along the top edge of the lantern, and fixing the bolt c, Fig. 5, attached to the lid into the corresponding holes in the side of the packing case, the whole is then ready for use.

25. To enable the operator, while signaling, to have easy access to the glasses, slides, &c., inside the packing case, one of the sides of the box is *hinged*, as shown at g Fig. 5, and also at d. Fig. 2, this flap falling outwards, forms a convenient ledge on which the signaller writing

A ledge for the writing materials. the message can place his writing materials, the light from the side pane of the lamp being reflected downwards on the ledge by

one of the tin slips previously mentioned, the centre of which has been cut for that use, does away with the necessity of having, as is now the

case, a *second* lantern at each station for this purpose. A place in the box is also made to hold a pen-case, signal book and ink.

26. The size of the packing case is less than one cubic foot, and its weight, when completely fitted, is about twenty pounds.
 Size of packing case.
 Its weight.

27. The following is a list of all articles supplied with the List of contained articles. Picket Lamp :—

1	lamp complete.	1	parabolic reflecter.	1	signaling shutter.
6	inches cotton wick.	1	scissors.	1	pricker
	pen and pencil.	1	chamois leather.	1	ink bottle.
9 glasses (3 white, 3 green, 3 red.)					

1 small box of powder for *occasional* use in cleaning reflector only.
 block tin slides to be cut, as required, regimentally.

28. The cost of each packing case in stained deal, with the iron fittings complete, would be, if a number Total cost of the apparatus. were required, about ten shillings: the cost of the lamp, with its reflector and fittings, would be about £2 10s., making the cost of the complete apparatus about £3.

ADDENDA.

29. Under the system of army signaling instruction now carried on at Aldershot, a number of men from every Number of soldier signalers in the British Army. regiment are trained to use Morse's signals. *Every troop or company in the service will*

eventually, if it does not even now, contain ten or a dozen soldiers

Could all effectually use perfectly competent to use, in a satisfactory the Picket Lamp.

One lamp per troop or Company.

Innumerable occasions when they could be used.

and the innumerable circumstances and occasions under which they could be advantageously used, whether in camp or quarters, on the line of march, or on picket or out-post, under arrangements to be made by officers commanding regiments, brigades, or even larger bodies of troops, will present themselves to all who will give the matter a few minutes consideration and thought.

30. By permission of the General Commanding the Sind District
 of the Bombay Army a Board of Officers,
 Report. assembled at Kurrachee, on the 24th of
 By a board of Officers in India. August, 1875, to report upon a Picket Lamp
 designed by Captain Frank James, Bombay
 Staff Corps, then Brigade Major of the Sind District.

PRESIDENT—Colonel H. Heyman, Royal Artillery, (for some years
 Secretary of the Ordnance Select Committee, London.)

MEMBERS—Colonel G. F. Berry, commanding 56th Foot,

Colonel J. M. Greig, Royal Engineers.

REPORT—"The Board, having examined the Lamp produced, is
 of opinion that the Picket Lamp as designed is susceptible of much
 useful application for picket, out-post and barrack purposes. As a
 lantern, per se, while developing considerable illuminating power, the
 cost would apparently not much exceed the present ordinary barrack
 lantern, while, in combination with the signaling shutter also designed
 by the inventor, it affords a very ready, simple, and effective apparatus
 for night signaling within a distance of five miles."

31. REPORT furnished to the above mentioned Board of Officers
 By H. Mance, Esq., Electrician, Government Persian Gulf Telegraph Department,
 Electrician, &c., &c. Inventor of the Heliograph and other signal-
 ing Instruments.

"The Morse alphabet can be signaled from Captain James' Picket
 Lamp at the rate of ten to twelve words per minute with the full
 traverse of the key and probably half as much again if the play were
 reduced for short ranges: in practice it would be found that seven or
 eight words per minute would be the fastest speed required at long
 ranges and twelve words per minute for short."

The mechanism working the shutter is so simple that I should say
 it would stand some rough usage, and a considerable amount of wear and
 tear before getting out of order. The key and shutter forms a complete
 part in itself and might be obtained for separate use with any form of
 lamp or stand. As the light is disclosed and obscured *instantaneously*
 the signals are likely to be sharper, and consequently more distinct than
 those sent by an ordinary shutter, this would prove a great advantage
 in working over a long range,"

32. Opinion of Captain F. A. Le Messurier, Royal Engineers
 Captain Le Messurier, R. E. Deputy Assistant Quarter Master General and,
 Inspector of Army Signaling. Inspector of Army Signaling Aldershot, May,
 1877.

"At the request of Major James I have inspected the signal lamp referred to in the accompanying papers and consider that it is all that it claims to be, and fulfils the object for which it is constructed.

The arrangement of the wick in the lamp, by which the full power of the oil light is obtained without a chimney, is of great value; as is also the shutter by which the light is sharply cut off in signaling.

We have need of an oil lamp of this description, at present there is nothing between the Hand Light, which is of little value beyond the distance of one mile, and the Lime Light, which requires the same labour, material and apparatus in the making of Gas whether used at a range of one or fifteen miles."

NOTE.—Special attention is invited to paragraphs, 7, 29, and 32.

Not required for September.

NOTICE.

UNITED SERVICE INSTITUTION OF INDIA.

An Exhibition of Military Drawings, open to all Non-Commissioned Officers and Privates of Artillery, Cavalry and Infantry doing duty with their regiments in India, will be held at Simla, during September 1878.

All drawings intended for competition, to be with the Secretary by the 15th September.

FIRST PRIZE	...	...	70 RUPEES.
SECOND "	...	...	30 "

The drawings to consist of Military Sketches of Ground, executed in the manner taught at the Garrison Instruction Classes throughout India.

Drawings may be sent either framed or unframed.

By order of the Council,

A. D. ANDERSON, CAPT. R. A.,
Secretary United Service Institution of India.

SIMLA,
1st August 1878. }

Print all this page

UNITED SERVICE INSTITUTION OF INDIA.

The Council give notice that Life members to the Institution will be admitted on the following terms.

"Old Members" Rs. 45 + Current year's Subscription = Rs. 50
"New Members" Rs. 50 + Entrance Donation = Rs. 55

Every Gazetted Government Officer is entitled to become a Member, or Life Member, on payment of the regulated Sums.

The Council give notice that a Gold Medal will be presented to the Contributor of the best Essay or Lecture published in the Institution Journal between 1st June 1878 and 31st May 1879.

NOTICE.—Back Numbers of the Journal can be obtained at Re. 1 per Copy on application to the Secretary.

By order of Council,

A. D. ANDERSON, CAPT. R. A.

Secretary United Service Institution of India

S. C. S.
SIMLA,
1st August 1878. }

Print this page -

N O T I C E .

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1879.

Members can pay their subscription to the Alliance Bank, Simla if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV, V and VI to any member wishing for the same.

A. D. ANDERSON, CAPT. R. A.,
Secretary.

ORIGINAL PAPERS.

I.

INFANTRY COMPANY SIGNALS IN ACTION.

BY CAPTAIN R. H. FAWCETT, 33RD REGIMENT.

The Field Exercise of 1877, in the general instructions for the Attack, lays down that "Movements in extended order must in general be regulated by word of command and signals. Calls on the bugle may occasionally be necessary as substitutes for the voice, but as they are liable to be misunderstood, and may reveal intended movements to the enemy, they should be seldom used, unless for purposes of drill." Again "the section leaders should conform to the signals or orders of the captain, and must regulate the fire of their sections." These signals (Part II Sec. 20) consist of a wave of the hand or the sword, or the head-dress being held above the head, as a signal to reinforce. The latter signal when made by a sentry on out post duty (see p. 321) means that the enemy is advancing. I venture to think that more marked and easily seen signals will be found requisite in action under modern conditions. I once had practical experience of the difficulty of conveying orders to men in action with the breech loader, having the command of a company skirmishing to cover the assault on Magdala. My men were firing very fast, and fearing that they might expend all their ammunition, I and my subaltern endeavoured to control the fire, but found that we had to take a man by the elbow and shout in his ear, and even sign to him, to cease firing for the purpose of conveying the order. On this occasion it was only our own men and the echo, that made any great noise; for the enemy, such as they were, could only fire an occasional shot. Boguslawski says that through the rattle of breech loaders nothing can be heard except a whistle, and this is undoubtedly true; except that he might have said a powerful shrill whistle. The Field Exercise acknowledges the use of whistles, saying that "whistle sounds are used either as signals, or to attract attention to the preconcerted signals of company commanders or section leaders." If it be allowable to criticize the Field Exercise, I would venture to say that, although I have not had much practice on the whistle, except to call greyhounds, it appears to me very difficult to produce, on that instrument, different notes that would be heard through the roar of a heavy fire, but that its value for calling the attention of the men to visual signals cannot be over estimated, and it should therefore form part of the equipment of every infantry officer. Perhaps the greatest step in advance has been to admit the danger of the use of the bugle in action. In peace time, or on the march, the value of the bugle as a peripatetic clock and drill signal cannot be dis-

puted; but in action it may do harm and cannot do much good. For if ammunition is expended and men's hearts are failing them, the bugle can sound the retire and be heard; but if all is going well and the men are ready to advance, such a fire is kept up that the cheering sound of the bugle would be drowned. The most striking and the best known example of harm done by the bugle occurs in the battle of the Alma, the description of which is to be found in Kinglake's History of the Crimea Vol. II p. 366 and seq. The whole extract is too long to insert here, but the facts were that the light division had stormed and captured the earthwork, called (probably on the "lucus a non lucendo" principle) the Great Redoubt. They obtained some cover from the parapet and were looking for reinforcements in order to advance. This is always a ticklish time. Just then "a mounted officer rode up to a bugler of the 19th Regiment and ordered him to sound the retire. The man obeyed, and the buglers along the whole line, from left to right, took up and repeated the signal." For some time the troops naturally preferred remaining where they were, under some cover, and with good opening for advance when in sufficient strength; but eventually it was "judged by officers and men that a signal twice made and twice carried on along the line from regiment to regiment was not to be neglected. The retreat began; and the men quitting the shelter of the breast work, fell back into open ground and incurred the fire which was pelting into the slope beneath." The story need not be continued at length; as every one knows, the breast work was finally taken by the reinforcements who had been slowly coming up. But this little episode of the bugle probably cost two or three hundred lives, and England's men are too precious to be thrown away to no purpose; to say nothing of the risk of losing a battle. It must be remembered also that the Russians were then armed with weapons as inferior to breech loading rifles as bows and arrows are to a musket, and were fighting in column, which is an excellent contrivance for preventing seven-eighth's of the men from using their fire arms.

The "mounted officer" who is said to have given the original order, if he ever existed, was never discovered. If we consider that a bugle call so sounded is by all rules of discipline and drill invariably to be taken up by all buglers, and that both rule and custom demand that it should be considered a positive order from high authority; for in drill time, or even on alarm, no one would dare to start a bugle call without such authority; and remember also that generally a bugler is a mere lad, all but unarmed, and quite unfit to meet in combat a full grown well armed man, it will I think be admitted that we used to put an instrument, whose power over troops is from long habit enormous, in a position where any fool or coward could in the heat of the moment use it; and that even if not so ordered, that the use or non-use of this morally powerful instrument depended on the nerves of any one of a number of mere boys seeing their first battle. It must also be recollected, that the soldiers of Alma averaged 12 years service and probably, as far as drill and discipline went, formed as good

a force of its size as has been shown in European warfare ; but when we have to lead soldiers of shorter service, though we shall have, no doubt, the same courage, all experience would tend to show that young troops would be more liable to temporary panics. I know that there are one or two other cases of the mischievous use of the bugle in action that I have met with in reading, but I have unfortunately no notes of them ; and if I had a hundred cases to adduce, they could only support one of the clearest and most undoubted cases possible, on which a good deal of enquiry was expended.

As a rule we get very little information on these points. I have heard on excellent traditional authority that in the Peninsular War our soldiers used of themselves to open out and take elbow room for their fire, but who could discover that important fact from any writer of the events of that time ? except it were by reading between the lines of Colonel Gawler's book. As to late wars, the newspaper correspondents are not likely to be in the front line of battle ; if they were, there would be fewer of them, and it would not be possible for them to give a description of a battle as a whole, which is what their employers wish. Of the great arraagements of war, of the line of action of divisional and brigade commanders, and even of their motives, a great deal of information has been given in the course of the campaigns of the last twelve years, but of the actual performances and difficulties of the company officers of infantry we seldom get any glimpse. Young officers in any army are unlikely to put forward any difficulties that would tend to show that their troops were not of most excellent quality ; and if they did, unless it was the most incontrovertible truth, it would be promptly suppressed. It is therefore with some feeling of confidence, that an account may be here given of the part observed by a subaltern in the battle of Wörth, which is quoted in the "Frontal Attack of Infantry" translated from the German by Colonel Newdigate. If not new to many, those who have read it will no doubt excuse my refreshing their memory. For if I may venture to say so, the account seems to me to bear an air of truth that seldom gets out, although English officers, I trust and believe justly, will consider that our men are of more unyielding and stubborn stuff and unless recalled by order (bugle or otherwise) will retain their ground as long as possible. The narrator says :

" Our Regiment soon received the order to advance. The fusilier battalion (in which I was) was moved out in company columns and advanced against the Sauerbach. When we came within range of the enemy's fire, the Schützenzug (shooting section) of my company, which I led, skirmished, and the two other Züge followed closed at a short distance.

In front of us there was a line of skirmishers which appeared to have taken the first heights of the hilly land lying towards Elsashausen. After passing over the Sauerbach, where I lost sight of the rest of my

puted ; but in action it may do harm and cannot do much good. For if ammunition is expended and men's hearts are failing them, the bugle can sound the retire and be heard ; but if all is going well and the men are ready to advance, such a fire is kept up that the cheering sound of the bugle would be drowned. The most striking and the best known example of harm done by the bugle occurs in the battle of the Alma, the description of which is to be found in Kinglake's History of the Crimea Vol. II p. 366 and seq. The whole extract is too long to insert here, but the facts were that the light division had stormed and captured the earthwork, called (probably on the "lucus a non lucendo" principle) the Great Redoubt. They obtained some cover from the parapet and were looking for reinforcements in order to advance. This is always a ticklish time. Just then "a mounted officer rode up to a bugler of the 19th Regiment and ordered him to sound the retire. The man obeyed, and the buglers along the whole line, from left to right, took up and repeated the signal." For some time the troops naturally preferred remaining where they were, under some cover, and with good opening for advance when in sufficient strength ; but eventually it was "judged by officers and men that a signal twice made and twice carried on along the line from regiment to regiment was not to be neglected. The retreat began ; and the men quitting the shelter of the breast work, fell back into open ground and incurred the fire which was pelting into the slope beneath." The story need not be continued at length ; as every one knows, the breast work was finally taken by the reinforcements who had been slowly coming up. But this little episode of the bugle probably cost two or three hundred lives, and England's men are too precious to be thrown away to no purpose ; to say nothing of the risk of losing a battle. It must be remembered also that the Russians were then armed with weapons as inferior to breech loading rifles as bows and arrows are to a musket, and were fighting in column, which is an excellent contrivance for preventing seven-eighth's of the men from using their fire arms.

The "mounted officer" who is said to have given the original order, if he ever existed, was never discovered. If we consider that a bugle call so sounded is by all rules of discipline and drill invariably to be taken up by all buglers, and that both rule and custom demand that it should be considered a positive order from high authority ; for in drill time, or even on alarm, no one would dare to start a bugle call without such authority ; and remember also that generally a bugler is a mere lad, all but unarmed, and quite unfit to meet in combat a full grown well armed man, it will I think be admitted that we used to put an instrument, whose power over troops is from long habit enormous, in a position where any fool or coward could in the heat of the moment use it ; and that even if not so ordered, that the use or non-use of this morally powerful instrument depended on the nerves of any one of a number of mere boys seeing their first battle. It must also be recollectcd, that the soldiers of Alma averaged 12 years service and probably, as far as drill and discipline went, formed as good

a force of its size as has been shown in European warfare ; but when we have to lead soldiers of shorter service, though we shall have, no doubt, the same courage, all experience would tend to show that young troops would be more liable to temporary panics. I know that there are one or two other cases of the mischievous use of the bugle in action that I have met with in reading, but I have unfortunately no notes of them ; and if I had a hundred cases to adduce, they could only support one of the clearest and most undoubted cases possible, on which a good deal of enquiry was expended.

As a rule we get very little information on these points. I have heard on excellent traditional authority that in the Peninsular War our soldiers used of themselves to open out and take elbow room for their fire, but who could discover that important fact from any writer of the events of that time ? except it were by reading between the lines of Colonel Gawler's book. As to late wars, the newspaper correspondents are not likely to be in the front line of battle ; if they were, there would be fewer of them, and it would not be possible for them to give a description of a battle as a whole, which is what their employers wish. Of the great arrangements of war, of the line of action of divisional and brigade commanders, and even of their motives, a great deal of information has been given in the course of the campaigns of the last twelve years, but of the actual performances and difficulties of the company officers of infantry we seldom get any glimpse. Young officers in any army are unlikely to put forward any difficulties that would tend to show that their troops were not of most excellent quality ; and if they did, unless it was the most incontrovertible truth, it would be promptly suppressed. It is therefore with some feeling of confidence, that an account may be here given of the part observed by a subaltern in the battle of Wörth, which is quoted in the "Frontal Attack of Infantry" translated from the German by Colonel Newdigate. If not new to many, those who have read it will no doubt excuse my refreshing their memory. For if I may venture to say so, the account seems to me to bear an air of truth that seldom gets out, although English officers, I trust and believe justly, will consider that our men are of more unyielding and stubborn stuff and unless recalled by order (bugle or otherwise) will retain their ground as long as possible. The narrator says :

" Our Regiment soon received the order to advance. The fusilier battalion (in which I was) was moved out in company columns and advanced against the Sauerbach. When we came within range of the enemy's fire, the Schützenzug (shooting section) of my company, which I led, skirmished, and the two other Züge followed closed at a short distance.

In front of us there was a line of skirmishers which appeared to have taken the first heights of the hilly land lying towards Elsashausen. After passing over the Sauerbach, where I lost sight of the rest of my

company, we were obliged to cross the wide meadow which lies between the Sauerbach and the base of the hills. On arriving near the first of these, I saw the skirmishing, line in front of me, come down the hill at full speed, evidently, as I thought, followed by the enemy at their heels. I made my Zug take up a reception position, in order to detain the pursuing enemy to the utmost. When the repulsed skirmishers had reached us, and had halted, I learnt from a man (there was no officer near at hand) that the French had attacked them with greatly superior numbers and forced them to retire. We waited, however, in vain to see the French appear upon the hill—no one came: there were only some of the enemy to be seen half-left in front of us, about 500 paces off. Nevertheless the men fired all they could; I tried to prevent it as much as possible.

Then there came along the line from the right, a summons, given by signs from the officers, to endeavour to storm the heights. The officers gave the signal to advance, and, the whole line of skirmishers went up the hill with hurrahs and fabulously rapid fire.

Arrived above, we saw dense lines of the enemy's skirmishers, at a distance of about 400 paces, run away with the utmost rapidity and disappear behind the nearest wave of ground. Why the French ran away from our thin line I cannot conceive. We followed as quickly as possible; the men indeed, so excited that they could not be prevented from firing at random. Then, suddenly, the advance stopped. We were just in a fold of the ground which allowed no general view. Before I could satisfy myself as the cause of stoppage, our whole line suddenly turned round, attended to no more orders and ran away:—no one being able to discover any apparent explanation for this phenomenon. The fact was that the French had made an attack on their side with reinforced swarms of skirmishers, which had repulsed our right wing, but which we, however, had not even seen. After about 200 paces we succeeded in bringing the line to a stand, I still saw no actual enemy, but we kept up, uninterruptedly, a very hot fire. We now again went forward, after having calmed the men as much as possible.

This time the French let us approach to within about 200 paces and then fired; it was a very critical moment. Then, however, the enemy's line all at once turned about and ran away; we followed shouting hurrahs and firing all the time. We had now approached to within perhaps 500 paces of the village of Elsashausen, the point d'appui of the French; on our left was the Niederwald. Here, however, we received such a fire that to press forward was impossible and all sought for cover. A long fire-fight now ensued, our situation was continually becoming more unpleasant; the men looked anxiously round to see if any supports were coming, but in vain. The officers could hardly keep the men still in the position. Owing to the losses of many of their comrades and the duration of the combat, which had now lasted some hours, they were thoroughly depressed. We then distinctly saw some

French closed battalions approaching for the attack. This was too much for the men. They turned about. All our efforts to detain them were in vain.

We did not actually run away, but the whole line went slowly back. We gave way, step by step, followed by the attacking enemy. I looked upon the battle as lost, for there were absolutely no reserves to be seen which could have supported us. We had already retired some 150 paces in this manner, when all at once we heard the sound "The whole to advance" and on all sides the call was taken up by the buglers. This gave the men fresh courage and the retreating movement ceased. At the same moment we saw some closed battalions of Würtenberger approaching. This was sufficient to make us all go forward with renewed life. We went against the enemy with ever increasing speed. The French turned, and then ran away."

There are one or two points in this worth noticing. It will be observed that the writer at a very early date in the action, lost sight of the rest of his company, and never appears afterwards to have found it. If this were of frequent occurrence it would tend to show that the tactical value of large companies in action has been overestimated, and also to show the need for some arrangement by which different companies could be distinguished at a short distance.

The immense amount of fire expended, most of which was at random, is also noticeable; for the Germans are next, if not equal to ourselves, in the attention they pay to musketry. It will also be noticed that the summons to advance to storm the heights was given by signs from the officers. As they had nothing to sign with except their swords, one would think that this could not have been very easily known through the line, yet it was taken up. The attackers seemed to have formed a rough line under no particular guidance, but with a strong tendency to conform to any initiative shown, whether of advance or retreat. At the end occurred, what will certainly appear in favour of the use of the bugle in action, that the sound to advance was at once taken up by the buglers. If we could arrange previous to an action that a bugle could sound nothing but the "advance," or other inspiriting calls, it might have a very useful moral effect when audible; the great objection to its use being that the danger of dispiriting effect by an uncalled for "retire" more than counterbalances any gain which may be obtained from it. Apparently the best thing for a captain of a company to do with the bugle during action is either to plug up the mouth with adhesive clay, or give it in strict charge of someone who does not know how to bring out the sounds, until the moment of victory arrives and it can be safely used. For on careful reading of the narrative it will be seen that the bugle only came into use at the end of the combat, when with the profuse fire that had been kept up, it would have been probable that the ammunition on both sides would have been expended to a considerable extent. Some men throw away their ammu-

nition faster than others. Hence there would be a lull in the combat, through which the bugle could be now heard, for in the previous parts of the battle no mention of the bugle is made. This is probably because it could not be heard, in fact it would not be heard except during those critical pauses in a battle when men are in a high state of tension of the nerves, and as the writer, evidently a courageous man, says he then looked upon the battle as lost, what would have been the effect upon his men of the "retire" at that moment? Yet it is just at such a moment that a signal may be given by the bugle, which will be obeyed from habit; though no one can tell whether it emanates from the Commander-in-Chief or from a frightened boy.

It is on these grounds, because the moral power of the bugle in action is too great in modern battles to be left to chance, that it is considered wholly unsuited as an infantry company signal in action. It may be said that the company commander always has his bugler by him and can control him. No one who has commanded a company on even a tactical field day will support this. A bugler on such occasions seems somehow, like the policeman of story, always out of the way when wanted. Yet if the bugler of the next company sound, he will at once take up the call, and for practical purposes give the order to the company.

I suppose there can be no doubt now, as to the complete mixing up of men in any battle under present conditions in Europe, and perhaps even in India. Take the earliest case, that of Alma, where the men and officers were of considerable average service, well drilled, not required to alter formation from column until within some 1500 yards of the line of defence, who were allowed time and took it, for steady deployment into two deep line, and for altering position to the right and the left, and who finally advanced in a well formed two deep line. Even then, what occurred? The front line soon became a confused mass. Sir Alfred Horsford, then commanding a battalion of the Rifle Brigade, says (see Royal United Service Magazine) that he soon had as many red jackets as riflemen under his command. As this was a direct simple attack, under most advantageous circumstances, with the exception of a stream and vineyards to cross, and as the fact, that troops do get mixed up in action, has been thoroughly shown by later events, and is even exhibited in ordinary peace manoeuvres, so much may be taken for granted, as a necessary accompaniment of an action. Now what is the best way for troops, to retain as long as possible, and to regain as quickly as possible, that order which obviously gives them the fullest advantages of the long discipline and training of peace time. I conceive it to lie in making the battalions, but especially the companies, distinguishable at a short distance, so that fragments of a company may be able to rejoin. It is probable, and indeed very likely, that the other two sections of the German Subaltern's company were within a quarter of a mile of him during the whole time, but there was no way in which he could distinguish the men of his own company out of a

line of soldiers backs. For this purpose the bugle would be of no use, for if every bugle sounded its company and regimental call, supposing even that we used noiseless guncotton for our rifles, it would resemble the bleating of a flock of sheep for their lambs, much intensified, and any particular call be undistinguishable in the general hubbub. It appears to me that there is only one way of showing the companies and separate tactical bodies, and that is by visual signals; thus the proposal is, that each company should have its distinctive flag, a small one, say a triangle, of which the two shorter sides may be a foot and a half and two feet in length respectively; sufficiently large to catch the eye of the reinforcements looking for it, without being so large as to attract fire, and moreover easily furled. The letter of the company and number of the regiment might be worked on them. I made experiments at the Curragh to ascertain the colours most distinctive, and Colonel Bray, C. B., of the 4th Foot, was kind enough to take interest in the subject and to try the use of the little flags with the battalion under his command. Common glazed calico was used, fastened on to sticks about four feet long. The stick of soft wood could be introduced into the muzzle, of a rifle where elevation was required, and there is no necessity, that I know of, that the flags should be of value, not easily replaced, and liable to form trophies for the enemy in case of capture. With regard to the colours, green is taken as one. There are several shades of green, some approximating to the blue, some to the yellow, but we found in the ordinary glazed calico, a green, that was unmistakeable for either in daylight at 100 yards or even farther. Black on the contrary was not easily distinguished from blue.

The colours then fixed on as best were—

for No. 1 Company Red.	No. 5 Red and white.
No. 2 " Blue.	No. 6 Blue and white.
No. 3 " Yellow	No. 7 Yellow and black.
No. 4 " Green	No. 8 Green and white.

By this arrangement the companies, whether of right or left half battalion, could be known at once; the flags, the left wing having the outer bisection of the triangle in white or black. But obviously the order does not depend on any special reason. If preferred it might run thus; No. 1 Company, Red; No. 2 Company, (which generally supports it in the attack) Red and white; No. 3, Blue; No. 4, Blue and white; and so on.

It was found in practice, that by the use of these flags, a battalion dispersed and mixed up, could be rallied with astonishing quickness compared with the ordinary method of men looking out for their colour sergeant or marker. And to my mind the chief value of these signals would consist in their forming an aid to prevent mixing up and consequent disorder as much as possible, by enabling reinforcing bodies to find their own comrades; no easy matter, I have noticed, even in

peace manœuvres on the open grass lands of the Curragh and on Salisbury plain, and also that at the close of a battle, the troops could be more easily and quickly formed up. Captain Seton says that the German Fusilier battalion he accompanied in 1870, were 40 minutes collecting their men on a similar occasion. I think it will be allowed that the men could find their comrades more easily by this plan than any other, and that in case of repulse and consequent retreat (which the Germans never experienced), the salvation of an army, even of a country, may depend upon how quickly men can be rallied and got in hand. Indeed, whether a victory or a defeat be the result of a battle, the chief object at its close, must be to sort your men, and get them quickly into formations easily controlled. In the first case, this is necessary, for the purpose of organizing a rapid pursuit; in the second case, to stop any tendency to panic, to calm the men, and to keep back the exulting foe as much as possible. Therefore, in any given battle, that army which can collect its scattered infantry into mobile formations in the shortest time must have an advantage.

When working through jungle, or in hilly ground, little flags like these would form almost the only means by which supports could keep the "touch" of their comrades in the front line; an occasional show of the flag would enable the supports to correct any slight error in direction, and the men in the front line would have the satisfactory assurance that their own comrades knew where they were, were near at hand and ready at any moment to give them the full benefit of their assistance. I would here say that I have no intention of proposing a regular system of signalling and sending messages, by these means, for I do not believe anything of the sort can be done in action; there are about three or four urgent needs that can be made manifest by very simple signs not easily misunderstood.

Thus the flag waved high, or head dress put on a rifle, should in all cases, I venture to think, whether on outpost or in action, mean: "It is all right, the enemy in no great force &c.," because at such times there is no great danger in attracting the enemy's notice. The flag lowered towards the ground several times, or a similar signal with a rifle, should always be the signal of distress meaning: "The enemy is in strength, come up and reinforce &c." The horizontal signals indicating movement to right and left seem to be the only other ones generally necessary. Directly you begin to use flags in connection with an elaborate code, which can only be recollectcd for a short time, you might have in action misapprehension and mistakes at a vital moment. It will be seen therefore that, for action, I merely propose a small flag generally furled, carried in exchange for his bugle, by the bugler as the captains' orderly, to be constantly near him, the duty of the bugler being merely to watch and keep with his captain and not to be straining his ears and attention to pick up other calls. If the captain is shot, the flag denotes the officer on whom the command has devolved, a matter of some little importance, as hesitation in obeying orders, from

ignorance of who is the commander, may be of the greatest moment at critical times. It is at such junctures as a rule, that the commander of the company would take the flag, and with it personally show what he wants, and encourage his men by his presence and bearing, made thus conspicuous to all those near him.

There are however occasions, especially those of piquet and outpost duty, where there might be no objection to the use of these flags for regular signalling by code, for which they are quite adapted. The great power of modern breech loading rifles will force us to throw out our outposts far farther from camp than of old. A correspondent of the *Times* (March 9th 1878) states that even at 2000 yards distance, bullets from the Peabody rifle used by the Turks were found to have great penetrative power. He says 16 inches into clay. The case of the Jowakis with a few rifles firing into our camps at night, shows that even in mountain warfare, with an enemy that would be comparatively insignificant in the plains, it is necessary to extend our outposts. But every extension of a line of outposts, either demands an enormously increased proportion of men for this harassing duty, or else increased intervals between piquets. The latter is for us the more likely solution to be taken, and as in this case more vigilance is necessary than before, there should always be means of intercommunication between piquets by signal. This want, the little company flags will supply by day. But what is to be done at night? We cannot bring all our piquets in close round the camp as of old, or else our camp may be fired into. No doubt there are some men who can calmly sleep while bullets are flying about, but they certainly do not form the majority of mankind, and if our men are kept awake at night we cannot get work out of them in the day. Twenty men with rifles might keep 2000 men awake and nervously harassed. It seems therefore probable that at night, piquets will have to lie out at a distance at least exceeding rifle range from the camp. It is beyond all things inadvisable to show a light when on piquet at night, as this points out the positions and would draw fire on the piquets. Hence signalling by dark lanterns would not do as a rule. But if a simple and cheap kind of telephone can be employed between posts, we should have one of the very best, safest, and most intelligible means of intercommunication either by day or night for stationary piquets. Another form of this invention may possibly be of great value to piquets. If the microphone can be so arranged as to magnify all sounds when required, it might be placed like a fougasse, on the glacis of forts, or in front of piquets, to catch and deliver clearly the tramp of armed men, the jingle and tread of cavalry, or the rumbling of artillery wheels. This would be of considerable advantage to the defence; for in future wars we may expect to find that night attacks will be far more employed than of old, in order to save troops from the destructive effect of distant fire in the advance. But the arrangement of attacks by night, so as to suddenly and unexpectedly assault from various quarters simultaneously, is one of the most difficult things in war; and it is very likely that more night attacks have failed from want of exact

combination on the part of the assailants than from the resolute fighting of the defenders. Hence a good system of intercommunication between various columns of attack, so as to ensure the simultaneous action of the whole, would be of the greatest value. But I must confess that for this purpose I can suggest nothing. Dark lanterns have been thought of, but though I am quite aware that good signalling can be carried on with them, I do not think that they could be safely used. In fact I am very much of Sam Weller's opinion, that dark lanterns are very nice things if they are managed properly, but when you don't want to be seen, they are more useful after the candle has gone out than when alight.

Gideon made a remarkably successful night attack with a species of dark lantern formed by small lamps inside pitchers, which latter were broken at the time of attack, (Judges VII, 16). But the institution of fire arms has altered the conditions. In fighting with the sword, the holder of a lamp has the advantage, as he throws the light into the enemy's eyes; but in fighting with firearms, the holder of the light is at a disadvantage, for he can be seen plainly and cannot see the other man in the dark. I think therefore the only effect of trying signalling by light in such case would be to attract fire. Hence I fear that we can only fall back on the bugle, but with special precautions to prevent its misuse. As in night attacks the troops would mostly be in column or formations admitting of their being well in hand, the danger may be less than in the open formations necessary in daylight.

I do not propose to go into the subject of the use of company flags for marking the position of companies, regiments, and brigades in camp, for use on the march, or when travelling by rail. I fancy their utility in such cases is sufficiently obvious. I only pretend to pave part of the road for a train of thought in what I believe to be a useful direction, and one of consequence to our army. It is very likely that the facts and arguments adduced will not lead everyone to the conclusion I have arrived at; but if they lead to the conclusion that this is an important subject, well worthy of consideration and to a final satisfactory result, my object is fulfilled.

R. H. FAWCETT.

II.

A MONTH IN THE BALKANS IN 1877.

BY FRANK EUSTACE, ESQ., R. H. A.

Accompanied by two brother officers I left London on the 25th October 1877, bound for Constantinople with a view of seeing as much as I could of the campaign in Turkey in the limited time the exigencies of soldiering allowed. I pass over the experiences of the journey, and our first impressions of that wonderful city so often described before. Suffice to say, that after a certain amount of discouragement and two days unavoidable delay owing to the washing away of a part of the railway by heavy rain, on the morning of the 7th November we found ourselves fairly started in the daily train for Adrianople, furnished with teskierates or permission from the Porte to travel in the interior, and from the Embassy a letter of introduction to Ahmed Vevik Pasha, the Governor of Roumelia, kindly given us by Sir Collingwood Dickson, who is well described in one of the "Society" Journals, as the Prince of Gunners, at that time head military attaché to the British Embassy. Twelve weary hours brought us to Adrianople, where the next day we were most kindly received by Ahmed Vevik Pasha, who invited us to dinner and furnished us with letters to Reouf Pasha, commanding at Schipka. As Ahmed Vevik has since filled the office of Grand Vizier, and is considered one of the leading statesmen in Turkey, some of his remarks may not be out of place. I may here state that his excellency in common with nearly all the educated Turks spoke French to perfection. His idea of Mr. Gladstone was the reverse of complimentary; he compared him with Mr. Cobden as "*un homme vulgaire*" but allowed the former patriotic ideas and the latter none. As to the many Bulgarian executions in his province, he told us only four were political, all the rest were criminal, that is the culprits were taken red handed and hanged as murderers. He was well informed on all the topics of the day and had travelled a good deal about the continent.

The next morning we started by rail for Philipopolis a picturesque town built on one of the many tumuli which stud the plain of the Maritza, as the river running through it is named. Here we purchased six ponies, one for each of us, two for our limited baggage, (we each had one bundle enclosed in a water-proof sheet and an extra one containing tinned provision and cooking utensils) and one for our dragoman, a Pole, Antoine by name, who spoke most languages "indifferently ill," and on the morning of the 11th got fairly under way for Schipka, our first point, distant two day's journey—about sixty miles.

On the evening of the next day, we arrived at Shekerli, a burnt village about two miles from the Turkish head quarters, where we were

most hospitably received and entertained by some English Doctors, and the next morning after paying our respects to Reouf Pasha, who also received us most kindly, we were conducted by Major Alister Campbell, an Englishman on Reouf's staff, up the left position.

The Schipka Pass is not a defile, but a winding road over the top of a hill about 400 feet above the plain in which the head quarters were, and leading from the village of Schipka on the Turkish side to Gabrova the Russian head quarters. Fort St. Nicolas is the highest point of the peak over which this road leads and was at this time held by the Russians. The Turkish position was divided into three attacks, of which the advanced trench of the centre was only 300 yards from Fort St. Nicolas. The left attack was on a nearly semicircular ridge, divided from the centre by a deep ravine, the out post at the extremity of the semicircle being further from the Turkish head quarters, in the plain below, than Fort St. Nicolas itself, and only 400 yards from the Russians right advanced trenches. The right attack did not extend so far as the left, but was like it divided from the centre by a deep ravine, and situated on a higher peak than either of the others, so from the extremity of the left attack we looked into the rear of Fort St. Nicolas which appeared wedged in between us and the Turkish right, at the same time this left attack itself forming a sort of wedge between the Russian right and centre. The whole position was most extraordinary and interesting.

Reouf Pasha's army at this time consisted of about 1700 men all told. He had 30 field guns and 12 mortars and two guns of position, distributed between three attacks. The horses belonging to the field guns were stabled in the plain, in mud stables, as were the cavalry. The guns of position corresponded (roughly) to our 40 Prs. The field guns to 14 prs. $3\frac{1}{2}$ inch calibre, rifled in 24 grooves, all were Krupp's steel, and all had the breech action and drag to check the recoil. He had only two regular cavalry regiments, the weakest part of his force both as regards numbers and efficiency, and this I believe was generally the case with the Turks. His infantry was exceptionally good, warmly clad, and well fed, as was all the force at Schipka, communications being open, and live stock plentiful. The only articles of clothing, which could properly be called uniform, were the universal "fez" and the great coat with which his whole army was supplied. This latter was of yellowish colour, and thick homespun material, made long and with a hood, a most excellent and serviceable garment. Otherwise "uniform" as we regard it was conspicuous by its absence; all the men wore, kamrbands and as is the custom with most orientals, wrapped up their waists with great care, leaving the throat exposed; their other garments, as far as we could see, were of the most nondescript kind. Most of the infantry wore sandals, tied on with string, and some had bandages on the legs, a few of the cavalry had leather boots, but not all, and most of the regular cavalry had blue coats, but the great coat above described was the only article one could term "uniform" in Reouf's force. The

sentries on the heights were supplied with sheepskin coats and gloves, the wool inside, highly necessary at such elevations.

In the advanced trenches the men were relieved at night; once in twenty-four hours; and the whole advanced force in each of the three positions was relieved once a week; the main force on each height, consisting roughly of about 3,000 men, was not regularly relieved at all, but remained permanently on the heights; occasionally, however, some part of them were ordered into the plain; a similar number from below taking their places.

The forces in the plain were in tents and were formed into a large entrenched camp on three sides; the fourth side being the base of the Balkans; the whole position, however, was evidently so liable to be turned by the Russians (as afterwards happened) that we could not help wondering at so efficient a force being kept here in comparative inaction, as since the great assault by the Turks in September on Fort St. Nicolas—which failed owing to Suleiman Pasha's tardiness in sending reinforcements—beyond an occasional bombardment, in which little harm was done, and continual interchange of musketry by the outposts, nothing was effected, and it was evident that the Russians were only waiting for Plevna to fall, and their right to advance, to take the position in flank, abandoning—if they ever entertained—any notion of a direct attack.

We remained three days at Shekerli, visiting one of the positions each day, and were much struck by the healthy and soldier like appearance of the gallant fellows lining the trenches and by the civility shown us by all with whom we came in contact. The cold even at this time was very great on the heights, officers and men however lived in mud huts, and fire wood was abundant. The batteries and trenches generally were well constructed, the embrasures being lined with gabions and fascines, gun platforms carefully laid down and cover as a rule well provided, though with true Eastern “insouciance” the magazines were carelessly placed, and the number of traverses between the guns and mortars was very insufficient, also above and in the plain there was an entire absence of sanitary arrangements, so the good health of the troops was the more to be wondered at. Reouf Pasha spoke to us very openly of Suleiman’s apathy in coming to his aid in August, when Gourko, after his successful passage of the Balkans, was driven back through the Schipka, and said—as is now generally believed—that if they had united their forces and pursued Gourko, or turned him, and followed up their successes, the result of the whole war might have been very different. It is not however the purpose of this article to comment on the strategy of the campaign, and I only mention this fact, as it is the key to the whole of the Turkish failures.—When the war began there was no commander-in-chief appointed, but several “Mushirs” (or Marshalls) were given commands of different army corps.—They, as a rule, knew that their continuance in command depended mainly on

their successes and on the caprice of the Sultan or Government at Stamboul, and therefore the victory of their own particular force was their chief effort. The result was self evident, and was the leading cause, no doubt, of the Turkish reverses.

Just at this time the Porte began to see clearly, that one man at the head of the army in Europe was absolutely necessary, and who did they appoint ? Suleiman Pasha, the villain of the piece, if I may so term him, who had not only thrown away opportunity after opportunity, and alienated the other commanders from him, but was even then under strong suspicions of being bought over by the Russians..

I think we have not much further to go for reasons for the succession of reverses which now set in on the Turkish side.

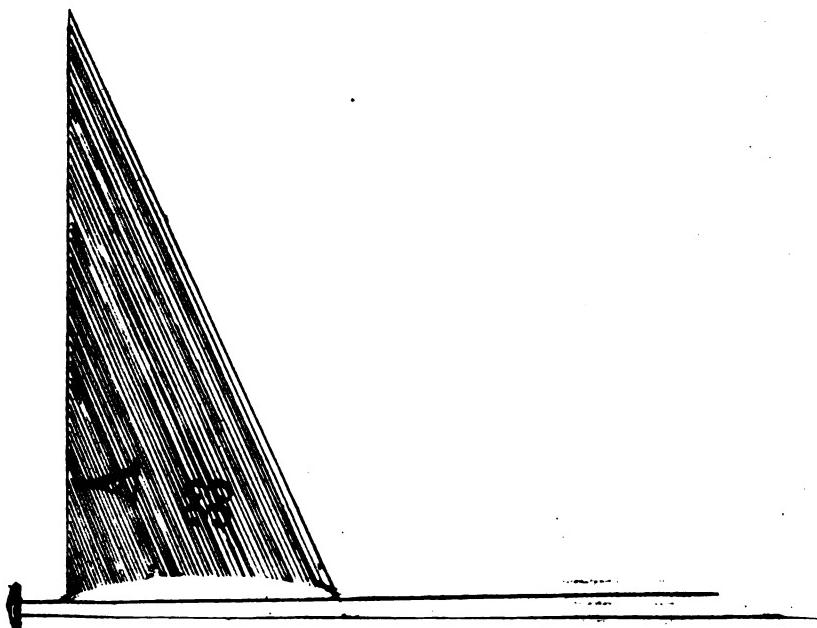
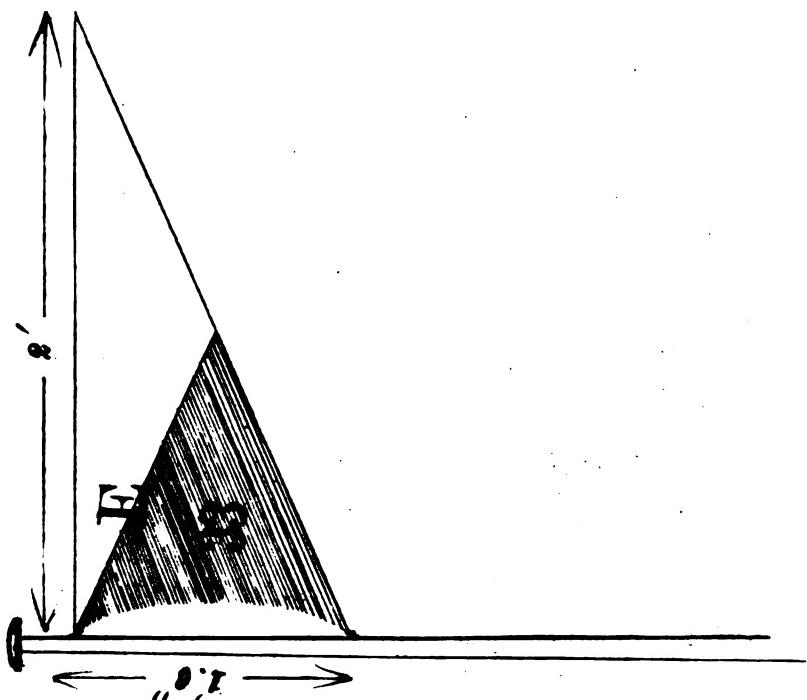
First we have the Sultan, weak, and easily led, with advisers as imbecile as himself or perhaps venial, at the head of affairs ; then the Marshals jealous of each other, and one or more not beyond suspicion of treachery, and finally the oriental doctrine of " Kismet,"—which, as far as administration goes, is best rendered by the vulgar expression " letting things slide"—so completely pervading the country in general, and the army in particular, that although this ruling idea made the rank and file face death so fearlessly, and take misfortunes and reverses so cheerfully, I cannot but attribute to it a main cause of failure.

No doubt the officers were deficient in education, training, and numbers, though not as a rule in bravery, and many minor reasons of failure might be adduced, but I believe the above three (or even any one of them), quite sufficient to account for the collapse of as grand fighting material as this generation, or perhaps this century, has ever seen.

Apologizing for this digression into the realm of first principles, I return to our journey.

On the morning of the fourth day, after our arrival, we took our departure for Orchanie, hearing there was to be an attempt to relieve Plevna starting thence. Reouf Pasha very kindly gave us an escort of a sergeant and five cavalry soldiers, and we were joined by Major Alister Campbell and Mr. James of the Scots Greys ; the former wearing Turkish uniform gave us the opportunity of seeing everything without let or hindrance. Reouf furnished Major Campbell with a teskierate for the whole party, and also with letters for Mehemet Ali and Chakir Pasha. We bad him adieu with much regret ; he is a gentleman in every sense of the term, and evidently thoroughly understood and mourned for the reasons, why the success of his country, without allies, was almost an impossibility.

For two days we marched keeping the Balkans close on our right, sleeping in villages on the road.—On the third day we crossed the



Balkans and arrived at Isladi (or Sladitza), where we were well looked after by the Kaimakam or head man of the town. On the fourth day we crossed the Etropol Balkans to Etropol by a very rugged path, keeping a good look out on our right for Cossacks, as we were told by some Circassians there had been a skirmish near Etropol the day before. The descent into the pretty little town of Etropol is through a beautifully wooded glen with a stream bubbling down it. The town is situated at the extremity of the valley of the little Isker and commands the Bulgarian end of the pass between it and Isladi. Our arrival caused some excitement, as except a German Doctor, we were the only Europeans (Turks never speak of themselves as Europeans) in the place. The Pasha Mustapha by name, sent his second in command to interview us, having assigned to us a very clean Bulgarian house as a temporary residence, and the next day, being invited, we accompanied him on a reconnaissance.

Omer Bey, the Colonel was a dapper little man who spoke French slightly, and as the Pasha was a typical Turk who seldom left his house, had the main direction of affairs, though he seemed to comprehend but slightly the gravity of the situation and the importance of Etropol as the key to the position in the next few days fighting, a fact which the Russians, as was shortly apparent, had already mastered.

From the top of a commanding hill about four miles off we had a magnificent view, facing N. E. Etropol lay to our right rear, the town of Orchanie almost directly behind us, and about five miles in front of us on the Orchanie Plevna road, we could see Russian cavalry outposts near the village of Osikovitza and plainly distinguish several battalions halted a few miles further along the road.

As an instance of rough and ready discipline I may mention, that a Subaltern Officer, showing some delay in turning out his advanced picket, the Bey ordered his Staff Officer to give him thirty blows with a stick ; the culprit however seeing what was coming, hastily put on his great coat, so no great harm was done, but this summary method of punishment in front of the whole escort seemed somewhat derogatory to our notions.

The next day we rode to Orchanie and visited Chakir Pasha who received us most cordially. He expected Mehemet Ali that evening, but quite understood that the relief of Plevna was now quite out of their power, as the Russians were evidently meditating an attack in force on the Orchanie pass ; and defence, with a hurriedly collected army, not yet in any way organised, was their only resource.

We rode back to Etropol in the evening, and the next day the 22nd November, the expected attack began. At the sound of firing we took up our position on the same hill and had an excellent view of the afternoon's skirmishing, though from the wide extent of the firing it was evident, that more than a reconnaissance was meant by the Russians.

We afterwards found, that the Russian attack to-day extended on their right to the village of Skrewena, three miles on Chakir's left, where they brought up a six gun battery with a small cavalry escort unsupported by infantry, which, being charged by the Circassians in some force, with a few regular cavalry, was driven back, leaving two guns to the Circassians, who behaved exceptionally well on this occasion, the extreme Russian left consisted of infantry skirmishers on a hill above the Turkish camp at Etropol, which made the total extent of the attack about fifteen miles. In the centre (the Plevna—Orchanie road) the Russians pushed forward with very slight resistance into the plain in which Orchanie is situated, about five miles from the town. On their left attack, which we saw ourselves, they soon opened fire with two guns in the Isker valley, and two more on a hill above, directing them at a small 3 Pr. Mountain gun close to us, and at the entrenched camp above the town, where the Turks had two 12 Pr. Field guns which answered their fire, but with little effect, on either side; the infantry skirmish continued on the extreme Russian left till dusk, when we could see them intrenching themselves in their positions in some strength. As the sun went down, the Turks in the camp gave their cheer "Allah Allah" which was responded to from the outposts.

The next morning (the 23rd) we saw the Russians had during the night pushed forward and erected earthworks overlooking Etropol, while the Turks had abandoned some strong advanced positions. Omer Bey however expressed confidence in being able to drive them back, in which we did not share, so sent off our servants and baggage with half the escort by a circuitous path over the hills to Orchanie, the Russians now possessing the road by which we had ridden there two days before. About two o'clock P. M., (their usual hour) the Russians advanced on the Turkish outposts, who began falling back after but slight resistance; while Mustapha Pasha, whom the closer approaching sound of musketry had at last induced to show himself, was in the entrenched camp firing his two guns at an enormous elevation over a hill, at an invisible enemy, instead of along the road up the valley where the Russians were advancing. The place was evidently doomed, though with eight battalions and strong positions, an able general might have held out for a long time, as the Russians were here apparently almost as weak in Artillery as the Turks, and a determined attempt should have been made to keep open the communication with Orchanie, from which, except by the circuitous mountain track twenty-four miles round, the town was already cut off. Disgusted with the incompetency shown, and fearing if we stopped longer we might share the fate of the garrison, or probably a worse one, at dusk we started to ride over the mountains without a guide as none was obtainable. As we passed through the pretty little town, every shop was shut, and all the Bulgarians in hiding. Their's was indeed an unenviable position, plundered by Circassians and Cossacks alike, their very lives on uncertain tenure, bitterly must they rue the day they broke into rebellion.

Darkness soon set in, the hill track was deep in snow and mud, and as we ascended we entered a thick forest and mist simultaneously. At length however by the altered position of our horses we were aware the descent had begun, and six hours after leaving Etropol, we came on the Turkish camp at Kamarli, since so famous. Here we rested in a hovel till daylight and continued our ride down the main Sophia road down the pass to Orchanie about twelve miles.

Chakir Pasha's camp was pitched above the village of Ivretchesh, about a mile in rear of the little town of Orchanie, immediately at the foot of the pass. The road or pass here runs through a defile with steep wooded slopes on either side. The first signs of retreat we now encountered, consisting of trains of arabas or bullock carts, toiling wearily along in the mud, full of women and children perched about on the top of their household goods. On arrival at head quarters, a council of war was being held in the large green tent which proclaims the presence of the mushir.

A telegram from Etropol had just announced its precarious state; we were able to inform Mehemet Ali who had arrived, of its condition last evening, and the result was that he decided to make his stand at Kamarli, at the top of the pass, where there was a line of six earthen redoubts, and to leave Chakir with eight battalions and twelve guns to cover the retreat at the bottom of the pass.

We rode into Orchanie to inspect the fortifications and found the town had been sacked by Circassians the night before. The Cossacks were in Lashein, a village about $1\frac{1}{2}$ miles off, and it appeared that on the night of the 23rd the Russians had pushed forward their centre as well as their left Etropol way, and had again driven in the Turkish advanced posts. On arrival at the entrenchments there were evidences of intended evacuation as the men were in marching order, the limbers near the guns and all tents struck but a few in full view of the Russians to deceive them if possible.

The next morning (25th) we were roused early by the news that the Russians were in Orchanie, only a mile from us, our resting place being as usual a Bulgarian hovel in the village of Ivretchesh, and that intelligence had been telegraphed to Chakir of the fall of Etropol; the whole army too appeared to be making its way up the pass. Again retreat was our only course, so we at once sent off our baggage and escort to Tashesen, about six miles beyond Kamarli on the Sophia road, where for the present at any rate, they would be safe; while we in light marching order could retreat at our leisure. We rode towards Orchanie examining it carefully with our glasses and could see no signs of life so went on into the town, which was entirely deserted. Returning, we met a Turkish officer who told us the Russians were making a forced march over the hills to Kamarli to cut off Chakir's retreat. This was unpleasant news, so we determined to lose no more time, but rode quickly up

the pass overtaking some cavalry and infantry regiments a battery of Field artillery and trains of arabs, with flocks of cows, goats and sheep. On arrival at Kamarli we were much relieved at not finding the place in Russian hands but instead Mehemet Ali in person in the main redoubt close to the road. He spoke of the surrender of Etropol (as it effectually was) in no measured terms applying to Mustapha the epithet of "mauvaise bête," our friend and Omer Bey having got away with all their personal effects, leaving their two guns to fall into the enemy's hands. Mehemet Ali's position at this juncture was not an enviable one. He was to have organised a force at Sophia of 20,000 men and to have attempted a grand relief of Plevna; instead of which on his arrival at Orchanie on the 22nd he found the Russians in force driving in the outposts and on the 24th heard of the taking of Etropol which commands the Isladi pass, luckily but a mountain track by which we had crossed a few days ago, so that his only hope now was to organise his scattered forces as best he could, and make a determined stand at Kamarli.

The main redoubt of Kamarli was a few yards only off the Sophia-Orchanie road, from this a line of six redoubts at intervals of about half a mile ran up to the highest peak of the Etropol Balkans, nearly 5000 feet above the sea, the top redoubt being situated on the summit, the prolongation of this line would nearly have run into Etropol in the valley below, there was a seventh redoubt on the other side of the road commanding the pass; these redoubts were of earth with parapets twelve feet thick and were square or nearly so, the exterior slopes were steeper than usual and the ditches deeper, altogether the position had good defensive capabilities.

Mehemet Ali's army was to have consisted of 20 battalions from Bosnia, 12 from Constantinople and six from Schipka with 72 guns and two or three cavalry regiments in addition to Circassians—of this force he had at this time Chakir's eight battalions, 4 Bosnian battalions and 8 Mustafiz or reserve battalions from Constantinople with about 36 guns; but as troops were coming in daily from Sophia and from Schipka, I doubt if the Mushir himself knew exactly the number of his command. His staff, a very weak one, consisted of Musaffir Bey, a Pole, his right hand man, Osman Bey an engineer officer and Baron Latiska, a retired Prussian officer, all of whom had been with him on the Lom.

A Turkish infantry battalion consists of 800 men, their arm being the Peabody-Martini rifle, though the Mustahfiz still carried Sniders. The Peabody-Martini is a splendid weapon, almost identical with the Martini Henry, and gave great satisfaction. Each soldier carries from 100 to 120 rounds in action; some of these are carried in cases sewn in rows round the breast of the coat which are very handy, the rest in a pouch suspended by a cross belt. Every battalion has 30 pack ponies or mules which each carry two wooden boxes with 1000 rounds in each box. Each man also carries five days rations of dry biscuit in his haversack.

Meat is liberally served out when available, though often biscuit was all the men had to live on for days. A cavalry regular regiment consists of six squadrons of 120 sabres in each. They are armed with the Winchester repeating rifle—and are mounted on small horses, mostly gulf bred Arabs.

A battery of Artillery consists of six guns horsed by large powerful horses; there are a few Horse batteries with mounted detachments. All the guns are Krupp's steel, the H. A. 7·8 centimetres about 10 pounders and the Field Artillery 9·2 centimetres, about 14·5 pounders. Their Artillery as a rule seemed to us far more efficient than their cavalry. There are six ammunition wagons, and six bullock wagons belonging to each battery. The Field Artillery gun limbers contain 21 common shell, 9 shrapnel and 4 case; the H. A. 26 common shell, 10 shrapnel and 4 case. Besides the 30 mules for carrying ammunition, twenty other mules accompany each infantry battalion, which consists of eight companies, one each company for water, one each for carrying spades, and 4 for the officers tents &c.

Each battalion should be complete in commissariat arrangements, which follow a day in rear under charge of the commissariat officer, who as well as the Doctors, hold combatant rank in the Turkish service. I say "should be" as with the exception of the Bosnian battalions none of the Mustahfiz or other troops that we saw on this side, were complete in anything. The Bosnian battalions however seemed well organised, their uniform, consisting of a blue tunic, loose trousers and shoes and gaiters, with the universal great coat, was in fair order, and the officers seemed to care for their men; the reverse of which was the case in the Mustahfiz battalions, who however, being the last reserve or "Landsturm," could not of course be expected to be so efficient as the others.

As well as the regular battalions there were with Mehemet Ali the usual compliment of Bashi-bazouks and Circassians. These receive no pay but are armed and live by plunder, as bad a system as could be imagined, and one which undoubtedly has brought such discredit on the Turkish army, as it is these irregular troops who plunder and murder the wounded after battle. The former I need scarcely say are infantry; they dislike going under fire and are unreliable, but are sometimes useful as feelers, advancing under cover till they draw down, and so show the position of the enemy. The Circassians are mounted mostly on wiry ponies, and are smart looking and often handsome and aristocratic in appearance, they are dressed in long homespun coats, tight in the waist, with fur caps and long boots, and carry their rifles slung over their shoulders protected by skin cases, they wear no spurs but urge on their horses by whips. In a hand to hand fight, they sometimes show much courage and determination, but are thoroughly unreliable under fire, and are all thieves, though perhaps some of the proverbial honor to be found in such society is not altogether absent.

Were it not for their influence through their women in the harems of the Sultan and leading pashas, there is no doubt they would not be allowed to attach themselves to the army; as it is, I believe, most commanders in the Field would much rather be without them.

The first attack on Kamarli took place on the 28th November; we were lodged at Tashesen, a village about six miles nearer Sophia on the main road, and having ridden over in the morning, found Mehemet Ali and his staff just leaving the redoubt, he very kindly allowed us to accompany him throughout the day. I wrote an account the same evening of this fight, an extract from which I now copy, as it should give a better idea of what took place than anything I could write after this lapse of time.

" Mehemet Ali mounted on a mule led the way up the heights; " with him were Musaffir Bey chief of the staff, Osman Bey the " engineer and Baron Latiska, ourselves (five in number) and an escort " of about twenty cavalry. From the hurried place at which the " Mushir proceeded it was evident that something of importance was " expected, as on the steep ascent rising from 2000 up to nearly 5,000 " feet we only made one halt to breathe our horses, when we plainly " heard the sound of distant artillery in action, proceeding from the, " bottom of the pass where Chakir Pasha was still holding Ivretchesh, " an unpleasant position, as now Etropol is in the enemy's hands, if he " is defeated to-day his retreat up the main road may be cut off. Such " is Mehemet Ali's fear and he openly tells us of it. At last, after much " slipping we reach the top redoubt, and here the view alone " amply repays us for our ride. A magnificent Alpine Panorama lies " stretched before us.

" Looking towards Etropol lying N. E., the range we are on runs " to our right and left, No. 1 redoubt being on the highest point " of this part of the Etropol Balkans; on our right there is at once a " steep descent, but on our left a ridge runs towards Orchanie, about a " mile and a quarter in length and varying in breadth from a quarter " to three quarters of a mile which is to be the scene of to-day's fight, " This ridge is quite bare of foliage and covered with snow to the depth " of nearly six inches; where the ground commences to decline how- " ever, on all sides of the ridge are thick fir woods. Scarcely have we " had time to look round us, when we hear musketry firing from our " outposts, about three miles off, amongst the wooded hills in the " Orchanie direction. The anticipated attack is about to begin. Before " starting, the Mushir had put four battalions in motion up the hill, and " we can see them in the distance wending their difficult way upwards. " At present in No. 1 redoubt and behind it we have only three batta- " lions and two Field guns, and these battalions are Mustafiz or " reserves, mostly old men. However the firing comes closer and closer " and the outposts are falling back, so " faute de mieux," the Mushir " orders a battalion of Mustafiz into action. With loud cries of

"Allah" they run down the short but steep slope which extends from "the redoubt to the ridge I have described and advance along it in skirmishing order. At this moment on a little knoll in the direction of Etropol about 12,000 yards below us, a Russian gun comes boldly into the open, and commences firing on the redoubt, soon followed by a second.

"These two guns kept in action the whole afternoon, a small entrenchment being speedily thrown up to protect them, in spite of our two guns, whose fire was however inexplicably slack, and though little harm was caused by them in the top redoubt, several men were killed and wounded in the redoubts lower down, the position, being a happy one for the Russians enfilading as it did the whole line of redoubts. Osman Bey in No. 4, redoubt was seriously wounded by one of the shells. In the meantime the Mustahfiz are slowly advancing but without much determination, the enemy are still hid in the woods, but the black patches on the snow show us that already their bullets are telling their deadly tale.

"The Mushir now goes forward in person to a small breastwork half a mile off on the ridge before described facing Etropol, we follow him and obtain a closer view. From this earthwork he now issues his orders and seeing the Mustahfiz flagging in their advance, a mounted orderly is sent back with all speed to order two of the Bosnian battalions which have by this time reached the top redoubt to advance. Soon we see them running down the hill and meeting the Mustahfiz now beating a decided retreat, they encourage their flagging spirits and all advance together but not for long, for soon we see them all hurrying back towards us though in some order, the rear occasionally turning and firing as they retreat.

"The short November day is now waning, and the bright sun which had made us forget a little the piercing wind, is nearly hid behind a distant hill. Mahemet Ali, whose face has lost his usual cheery look, returns to the redoubt; on our way we fall in with the wounded, some on pack horses, some helped along by their more fortunate comrades, the white ground on the slope up showing many a red stain, and looking back at the extremity of the ridge we can see a thin line of enemy's skirmishers steadily advancing. A statement is now made to the Mushir by an officer sent hurriedly to him which explains the rout, for so it has become, The Mustahfiz it appears are armed with Sniders, and the Bosniacs with Martini-Henry's, and the pack horses which always accompany the regiments into action with reserve ammunition have got mixed, so many soldiers, having shot away the cartridges on their persons, find their weapons useless. Men cannot be expected to stand as targets, not even the gallant Bosniacs, so every excuse must be made for them; and now the enemy having actually appeared from the cover of the pine woods, one gun from our redoubt and several from the others

" lower down are fired on the skirmishers and with good effect. " Their " advance is stopped ; but complete darkness now sets in and in " the night the enemy will doubtless entrench themselves on the " end of the ridge. We now commence our descent, leaving several " thousand men to pass the night in the bitter cold at this great height, " and as but few tents are yet brought up, most of them must sleep, if " sleep they can, in the open at any moment liable to attack. This " mountain war-fare in winter is indeed terrible work and some terrible scenes we see on our tedious and slippery ride. It is freezing hard, " the mountain side is like ice and the sufferings of the wounded, " brought down on pack horses, who often fall, and sometimes roll over, " heart rending to witness. So ends to-day's fighting, its tale being " unfortunately a repetition of that of the last week— continual falling " back."

I have tried to describe this day's attack at some length, as I hope it may give some idea of the hardships both sides were beginning to undergo and which continued until peace was declared ; also the incident of the ammunition becoming mixed is worthy of notice, paralyzing as it did two splendid battalions, and showing the disadvantage of troops carrying different arms ; a lesson for ourselves may be drawn from it. The next morning (the 29th), expecting a renewal of the fighting, we rode over to Kamarli early and on arrival met Chakir Pasha in person, who told us, after a sharp engagement yesterday he had effected his retreat in safety up the pass. About 1.30 p. m. as we were sitting in the English Doctor's tent our dragoman ran in and said he thought the enemy were advancing in strength along the ridge. With our glasses we could see them in three columns, the dark masses standing out boldly against the snow. Mehemet Ali started at once for the heights, ordering four of Chakir's battalions to follow. Six of his guns had already been sent up the hill, and six more were in No. 7 redoubt the other side of the road into which we at once proceeded, it commanded an excellent though distant view of the ridge, and the six guns were soon in action enfilading the Russian columns, though at a distance of at least 2500 yards, so no great harm apparently was done. Meanwhile the enemy advanced slowly but steadily along the ridge, in splendid order, skirmishers in front, then the three main columns in company columns, and a reserve column in rear. It was a dull day with clouds hanging about the hill tops which favoured the advance, as except from our distant flank fire, and slant fire from the lower redoubts, the enemy were at present unmolested, as the top redoubt, the probable object of attack, was lost in mist and soon the Russian columns disappeared from our view in the clouds. A period of intense anxiety now ensued, broken by musketry firing for twenty minutes or more ; then all was still and darkness set in. What had happened we shortly heard from Mehemet Ali himself. It appeared that in the mist the leading Russian battalions which were of the 11th Regiment; probably missed their way and found themselves close to No. 3 redoubt, the third from the top. This was manned by the Jerusalem Regiment, a crack corps who poured a

furious fire on them with great effect, not however at once stopping their advance. On they came unwavering, blackening the snow with dead and wounded, till bayonets actually crossed on the parapet, and not till they had been twenty minutes under this murderous fire did they commence to retreat leaving over 300 dead within 200 yards of the redoubt.

The effect of this repulse could scarcely be overrated. It put spirit and confidence into Mehemet Ali's scratch force, and although executed with wonderful courage was no doubt a false step on the part of the Russians, in fact the first mistake of the week's fighting which commenced with the attack on Etropol on the 22nd and which had been so far planned and carried out with marvellous skill and success, showing that a commander possessing good information as well as skill in strategy was directing the Russian movements.

This general proved to be Gourko. At the same time it must be admitted that until today, owing to various reasons which I have tried to explain, the defence on the Turkish side was quite inadequate to the strength of their positions. Unfortunately, at this most interesting time, we were obliged to start homewards, so with much regret turned our horse's heads to Sophia next morning, arriving there the same evening. Here we found Baker Pasha accompanied by Majors Allix and Baker hurrying to Kamarli to take command of a division under Mehemet Ali, who was soon after recalled by the misguided authorities at Stamboul. The remainder of the defence and retreat from Kamarli with the famous fight of Tashesen, where Baker with 2500 men gained an actual victory over 30,000 Russians is now a matter of history, and my province is only to try and narrate what we actually saw.

At Sophia we were beset by newspaper correspondents anxious for news ; I may state that not one was present at the last two days fighting on the Turkish side, as they never expected the Russians to attack so quickly in the snow which fell heavily on the 27th, and had retreated to Sophia. Having gratified them, we proceeded to sell our horses and engage post arabas to take us to Tatar Bazarjik which we reached after a most shaky drive of twelve hours, there taking the rail and arriving at Constantinople on Wednesday the 5th December exactly four weeks after leaving it. Another week saw us safely back in London.

F. J. W. EUSTACE, *Lieutenant,*
Royal Horse Artillery.

III.

THE ADAPTATION OF RAILWAYS TO MILITARY
TRANSPORT.

BY MAJOR A, LE MESSURIER, R. E.

Military Transport by rail means the carriage of, and accommodation for men, horses, guns, wagons, stores, and war material of all kinds, and includes certain details of arrangement, which may be separated as follows :—

- (1.) Fixing the embarking stations where rail transport begins.
- (2.) Stating the transfer stations *en-route* where from break of gauge or other causes, the loads have to be shifted.
- (3.) Determining the disembarking stations where transport by rail ends and road transport begins.
- (4.) Arranging time tables.
- (5.) Collecting rolling stock to make the trains.
- (6.) Making up trains to suit the nature of the load, and the different arms of the service moving.
- (7.) Making trains up to the proper size, so that the hauling power of the Locomotives is neither exceeded nor wasted.
- (8.) Moving from camp or quarters to railway stations.
- (9.) Embarking, or loading trains at the railway stations.
- (10.) Travelling by rail.
- (11.) Disembarking, or unloading trains at railway stations.
- (12.) Moving off from the railway stations.

In England after much consideration, the Railway Committee of Principles. which the Inspectors of the Board of Trade are members and the Quarter Master General of the Army is President, has come to the following conclusions :—

- (a) That any attempt at hurry, so far as Railway transport is concerned is a mistake.
- (b) That a steady despatch of trains at fixed intervals of $\frac{1}{2}$ an hour each, is the maximum that can be attained on a double line.
- (c) That the railway authorities must have their functions in this question clearly pointed out.
- (d) That each unit of the Military service must travel complete in itself.
- (e) That the ordinary rolling stock and appliances of the country must be utilised.
- (f) And finally that any attempt at interference on the part of the Military with the Railway authorities would be a fatal error.

These principles may be accepted for India and it behoves us to consider how many of the details of arrangement already enumerated, rest with Applicable to India. the Military authorities, and how many remain for the Railway Agents and Managers to carry into practical effect.

(1, 2, 3.) The starting, transfer and disembarking stations and (6, 7) the nature and extent of the trains requisite would be determined by the Military authorities and on these would depend (5) the collection of the Rolling stock by the Railway Agencies (8, 9, 11, 12) the approach to, the embarkation and loading, at stations, the disembarkation, unloading, and moving, from stations are strictly Military movements while (10) the journey by rail would be performed solely under Railway management on (4) the Time Tables which are to be prepared by the Railway authorities on data supplied by the Quarter Master General and after approval embodied in the regular working tables of the several lines under the heading of "Troop Trains."

Briefly then there are certain conditions which must be fulfilled by the Military authorities before the Civil functionaries can operate in collecting the stock and hauling it with its military freight to destination.

The elements thus introduced in working towards one common end are two, Military, and Civil, and in dealing with the subject this evening I propose to confine my remarks to the action that has been and is being taken by that section which I may say is not represented at our meeting, not only because it pleases me to bring to notice the energy and qualification of a large body of men connected with our Indian railways, but also to shew what a powerful machine the Military possess for their own ends, if by a little study they will learn

how to use it, and by a little practice maintain it in working order for all time.

Railways were started some 27 years ago in different parts of India under Governments more or less separated
 Introduction of Railways in 1863. from central authority, the first section being opened from Bombay to public traffic in April 1853, and until the several lines were joined one with another, the pattern of the rolling stock so long as it suited local wants and was within certain fixed dimensions did not become a matter of any great importance.

The first through connection by rail was made at Jubbulpore on 8th March 1870, when H. R. H. the Duke of Edinburgh in the presence of Lord Mayo drove the last key within the station limits and the difficulties which from that time were experienced commercially from the interchange of stock of different types sooner or later attracted the notice of the Military authorities when dealing with the transport of reliefs and invalids.

I will now proceed to read some extracts from "Notes on Railways,"
 " by Captain Collett.—"Colonel Hamley
 Military wants in 1873. " states, that, during the preparations for
 " the great struggle of 1870, the French Railways were scenes of
 " disorder and obstruction while those of Germany were acting with
 " the unity and certainty of full rivers flowing towards the sea.
 " It seems clear that unless we, too, elaborate some such system as that
 " sketched above, we shall fail to obtain full advantage from the military
 " strength, we undoubtedly possess in our rapidly increasing system of
 " Railways: and prudence dictates that now, while we have the opportunity of leisure, a scheme for the war organization of Railways should
 " be prepared * * *."

" If this were done, both the railway officials and the military officers in command would know exactly what were their respective powers and duties, and the maximum use would, in time of trouble be at once got out of the railways; whereas if, as at present, we trust to our luck sudden pressure comes, the ordinary machinery is thrown out of gear, nobody knows their proper place or duty and half the value of the railways is lost, because we do not know how to apply the power we possess * * *."

" We have already a few specially constructed hospital carriages on each line, sufficient for present requirements, but obviously inadequate for the wants of an army in the field. It would, of course, be impossible to maintain at all times a stock of special vehicles, which might not be required once in a century and it becomes necessary therefore to consider beforehand how ordinary vans and passenger carriages may most conveniently be altered into vehicles suitable for the conveyance of the sick * * *."

" This subject of sick transport by rail calls for attention in India. " Not a farthing of expense need be incurred, but we should have recognized plans suggested by competent officers, and approved by authority for converting the different kinds of ordinary rolling-stock into hospital carriages; also tables of the numbers each vehicle can contain, and instructions for the best means of obtaining the greatest possible comfort for sick and wounded men during the journey. This information should be embodied in the official Railway Regulations, which are now entirely silent on the subject. It might not be impossible so to modify the construction of some portion of the regular rolling-stock of Indian railways as to render it easily convertible into hospital carriages, and to oblige every company to maintain a certain number of such vehicles. There can be no doubt that all these matters should be thought out now in the leisure of peace, so that when the occasion arises, both staff and medical officers may know what to do, and the wounded may be saved the additional sufferings which bungling and ignorance, however well intentioned must certainly cause."

" The conveyance of horses is also a point requiring attention. " The regulations merely inform us how many animals the regular horse box contains, whereas it is well known that all the horse boxes in India would not convey a single brigade, and we should, of course, have to use cattle trucks or covered vans, which are indeed much more convenient for the purpose, as horse boxes would lengthen the trains to a very inconvenient extent."

" The subject of the conveyance of supplies by railway has so far as I know, received absolutely no attention in this country. The best way of packing bread so as to obtain the necessary ventilation; the capacity of the several vehicles for cattle, sheep, flour, hay, straw, gram, fuel, &c., should all be ascertained and recorded. I do not believe there is a commissariat officer in India,—there is certainly not a staff officer, who could give an accurate estimate of the number of vehicles that would be required to supply a force of 10,000 men for a week. There are no data for such a calculation in existence, and the Railway Regulations do not allude to the subject, yet it is most important that such information should be collected and made available for ready reference. There would be no difficulty in doing this now, and a little fore thought may save a disastrous break down hereafter."

" I am not aware if the Ordnance Department know what each pattern vehicle on the different lines in India can carry in the way of siege guns and their ammunition, or how many trains would be necessary to transport, say, a second class siege train with 200 rounds per gun; but if not already collected such information should be at hand in every arsenal office in India. The Railway Regulations tell us something about the conveyance of field guns, but nothing regarding heavy artillery. So with the conveyance of small arm ammunition,

"we are informed that a powder van carries five, six, or eight tons, as "the case may be, but it would be convenient to know how many boxes "of Snider ammunition this weight represents, or, to put it in another "shape, how many powder vans would be required to carry 200 rounds "per man in box for 10,000 men. It might also be convenient to know "how ammunition could be most safely conveyed in other than the "regular powder vans, and what special precautions would be advisable. "There are only 78 powder vans in the whole of India."

" We might also now consider with advantage whether any reduction in the weight of the camp equipage, or number of followers which "are thought necessary for troops taking the field in this country, could "not be effected. Our Official Railway Regulations, though full of lucid "instructions as to who is, and who is not, entitled to a railway ticket "at the public expense, are entirely silent regarding what may be "termed the war uses of railways, and the fact furnishes a convincing "proof, if one were needed, that this aspect of the question has not yet "received adequate attention."

These coming as they did from an officer of the Quarter Master General's Staff in 1873, no doubt led to further enquiry and the course of such enquiry I will endeavour to follow.

During the cold season of 1874-75 the General Officers Commanding Divisions and Districts traversed by Experiments 1874-1876. the lines of Railway were authorized to employ the railway stock and plant for the instruction of the troops and to ascertain from actual experience the time necessary for and the best method of, loading and unloading all arms and stores.

The result of these experiments was that certain requirements were wanting chiefly—

- (a) Sufficient height to enable horses to enter and travel in the wagons without difficulty.
- (b) Protection from the weather.
- (c) Ventilation and it was noticed that—
- (d) The "end loading system" by which horses and guns could be run on to trucks from the open line appeared so advantageous as to justify further enquiry.

On the gathering of a large force at Delhi, during the cold season of 1875-76 the opportunity was taken to prosecute experiments on an extended scale when Lord Napier of Magdala and Colonel Sir Andrew Clarke, R. E., appointed a Joint Committee of 26 Members under Lieutenant General Sir Charles Reid, as President. From this time the Public Works Department may be said to have taken an active share in the enquiries, and the subject thenceforth came to be dealt with in a comprehensive manner.

The investigation was most thorough and full advantage was taken of the presence of so many Railway men to secure in writing their opinions on the various and important points under consideration.

This Committee advocated that—the goods stock should be reduced with some few exceptions to 2 types ; the one a covered goods wagon capable of carrying 6 horses at least ; the other a low sided truck with its ends to fall, for end loading guns and wagons ; that passenger carriages should be adapted for the conveyance of the sick ; that the number of horse-carrying vehicles should be increased ; that the number of followers, baggage and tent equipage allowed for inland active service should be reduced ; and that the duties and responsibilities attaching to Military and Railway officers in time of war should be defined.

During the summer of 1876, an exhibition was held at Brussels and while at home on privilege leave, I was, at the desire of Sir A. Clarke, deputed by the Secretary of State to examine and report on the different appliances connected with the transport of the sick, so that the Government of India might receive the latest particulars of continental practice.

During the cold weather of 1876-77 experiments were carried out under Brigadier General H. R. Browne, at Agra chiefly connected with the carriage of the siege train in metre gauge wagons and during last March a third Committee completed some enquiries, in more particular regard to the fittings necessary for sick transport.

To take the suggestions of Sir C. Reid's Committee as they occur.
*The reduction in the number of
 General conclusions thereon. types of stock.*

On some lines there are at present nearly 30 classes of coaching and goods stock besides some of the types having 3 or 4 varieties. Beyond the commercial advantage of having a few types only of an uniform pattern, so that what would fit one wagon would fit another, and the cost of repairs thereby largely reduced, it is perhaps scarcely necessary to quote the American war, where the want of uniformity in design of locomotives and rolling stock, was found to be more hurtful than the destruction of the line and material effected by the enemy.

The covered goods wagon is by far the most numerous of all the types in India, and an improvement was demanded by the simple fact that horses could not be loaded in the wagons then existing without chance of injury. The E. I. R. alone out of a stock of 7000 having only 128 wagons with suitable height of door.

The lowsided open truck is also generally useful in India, and by making the ends to fall, a train could be formed, so that with the aid of portable ramps, guns and military wagons could be run in from the ends in a continuous string on the open line, without interfering with the station platforms from which the men, baggage, and horses, would be embarked.

Passenger carriages were selected for the conveyance of the sick, because the goods stock, with stiffer springs, less protection from the weather, and want of proper ventilation, was unsuitable.

The necessity for an increase to the number of horse carrying-vehicles was evident, because at the time there were only 291 horse boxes in India capable of carrying rather less than 1100 horses. This want prominently came into notice when it took 36 hours to collect the necessary horse boxes at Poonah, an important Railway station, for the transport of the artillery to Baroda during the trial of the late Guicowar; and again when on the occasion of the visit of H. R. H. the Prince of Wales to Guzerat, the train, with an escort of the 3rd Hussars (46 horses) was 3 hours and 40 minutes late in starting for want of horse boxes.

The question of reduction in followers, baggage and equipage, is an important one, and to give an idea of the proportions these attain, the figures for a force similar to that assembled at Delhi during 1875-76, may be taken.

Officers and men	...	28,932
Horses	...	8,403
Ponies and Mules	...	3,851
Bullocks	...	861
Followers	...	30,234
Baggage tents and supplies	Maunds	3,016
Guns, artillery and Engineers carriages	...	278

remembering at the same time, that the Staff, Commissariat and Medical Departments, the 2nd line of artillery wagons, ambulance and small arm ammunition columns, are not included.

As the direct outcome of these enquiries I cannot do better than Action of Government in read a Minute written on the 8th March 1877. by Sir Andrew Clarke, embodying the suggestions of the various committees and defining very clearly the policy proposed by the Government of India for adoption. It runs this :—

" We have now received the reports of Lieutenant-General Sir C. Reid's Committee on the transport of troops and material by the broad gauge-lines, and of Brigadier-General H. R. Browne's on the metre-gauge lines, as well as the Report by Major A. LeMessurier, R. E., on the arrangements for sick transport exhibited at Brussels in August 1876, and I think there is sufficient material to enable us to pass beyond the region of enquiry, and give practical effect to the various suggestions that have been offered. These recommendations I will now review."

" 2. In dealing with the results that have been obtained, the manner of loading may properly receive the first consideration."

" The general adoption of the end-loading system has been very strongly advocated, but while recognising the advantages claimed for it, viz.—

" Of loading or disembarking on the open line."

" Saving in time for all arms except Infantry and Commissariat."

" Economy of space when loading guns."

yet, as all the stations and stock throughout India have been made to suit side loading, and as the system of end-loading, if applied to the covered stock, would be commercially injurious, it is evident that any general alteration is now out of the question, except at an expense far beyond the necessities of the case."

" 3. Next in order comes the rolling-stock, its uses and capabilities"

" *In Passenger Carriages.*—No alterations beyond those to meet the special requirements of sick transport appear necessary; sick and wounded in large numbers on an emergency would be carried in covered goods wagons, but in an Indian climate the present type, with insufficient ventilation, stiff springs, and a roof and sides of iron, is not at all suitable.

" The third class carriage for the present should be made available for the purposes of sick transport. The interior fittings, seats, partitions, &c., should be easily removed, and the requisite fittings, whether standards of wood or of iron, sling ropes, spring hooks from the ceiling, or springs on the floor to carry the stretchers and doolies, should as easily take their place."

" Five per cent. only of the stock need be dealt with in this manner, giving about 20 such carriages to both the East Indian and Great Indian Peninsula, 10 to each of the Sind Punjab, Madras, and Oudh, and 6 to the Baroda Railway."

" Constant attendance on the sick renders end-doors to these carriages necessary. They should not be less than 3 feet wide, and side openings should be provided for in addition, by making some of the window-pillars movable at will, so that the patients can be passed into the carriage on their stretchers from a side platform."

" The carriages so altered can still be run for the ordinary traffic, but they, to be easily obtainable, should be distinguished by the usual red cross."

" These ambulance carriages are quite distinct from the more special wagons which are required for cooking, dining, surgery, necessary, stores, &c., to complete the regular field hospital trains, and with which each Company in India should be provided."

" Instructions might issue on these points to the Director of State lines, with a view to the necessary arrangements being prepared for the Frontier Lines."

" In Goods Wagons.—Delays in traffic have arisen both from a paucity of stock and from the types of wagons being so numerous, that sufficient of one class cannot always be collected to meet a special want."

" These difficulties can best be avoided, while securing great commercial and economic advantages, by reducing the stock in India with some few exceptions to three types, *viz* :—

I.—That of a ballast wagon with falling ends and sides.

II.—That of an open high-sided wagon with end and side openings.

III.—That of a covered goods wagon with means of ventilation.

" 4. In regard to the first type, the existing open trucks have been selected for the transport of guns, wagons, carriages, pontoons, &c."

" It is admitted that these trucks would be much improved for military use, and not in any way injured for commercial purposes, if their sides and ends are made to let down. This class therefore can be altered so as to admit of end-loading, and the total stock of 4,533 trucks would, in the ordinary course of renewals, be completed within ten years at a moderate cost. The Great Indian Peninsula Railway estimate was Rs. 35 per wagon, and a rate at Rs. 50, the total amount would be 2½ lakhs, involving a yearly expenditure of about Rs. 23,000."

" 5. Of the second type, the open high-sided wagons, there are 2,743, and two-thirds of these belong to Madras."

" The abolition of this type has been recommended, but this cannot be effected until the covered goods stock has been altered, or some arrangement has been made in the low-sided stock to supply a carrying power for horses and cattle, &c., which these wagons chiefly possess. If the retention of this class is necessary for local wants, its renewal must be carried out on the end-loading principle to assimilate as much as possible with the low-sided class generally."

" 6. In regard to the third type.—Throughout Northern India and the Deccan the covered goods wagons form the bulk of the stock, but in Madras, where the traffic is not affected by the seasons, the high-sided open wagons are chiefly in demand, throughout the year."

" The present covered goods wagons require no alteration for the conveyance of commissariat supplies, stores, ammunition, baggage, camp equipage, harness, tools, &c.; and by the reduction of types (para. 3) it

is probable that they would never be required for the transport of guns. They have a further advantage in admitting 16 men with their kits and 1, E. P. tent, a particularly convenient unit, as the detachment is complete with its camp-equipage and baggage as it sits in the van. The men are not crowded, and can lie down comfortably."

" As a class, however, they have been pronounced unsuitable for the carriage of large horses and cattle owing to a want of height in the doors and roofs."

" The existing means for the transport of horses is palpably deficient, when it appears that for the carriage of 11,492 horses and ponies, and 2,589 bullocks in the Delhi Camp of 1876, 2,500 horse-boxes and high-sided wagons, would have been necessary. To meet this demand, there were only 291 horse-boxes in India and 2,743 high-sided wagons (two-thirds of which belong to Madras).

" It is important therefore that the covered goods wagons (a class forming the bulk of our Indian rolling-stock) should be made available, with a sufficient height of door and roof to accommodate horses, and with a sufficient width of door to admit of the easy entrance of doolies in times of emergency (para. 3)."

" The return shows 11,193 as the number of covered goods, and assuming that two-thirds of these required the alteration at a rate of Rs. 200 per wagon, the total outlay would reach 15 lakhs at a yearly outlay of 1½ lakhs."

" 7. The principles enunciated above apply generally to the broad-gauge and to the metre-gauge stock (with perhaps a slight exception in the carriage of horses), and the requirements for the future may be briefly set forth as follows :—

I.—PASSENGER CARRIAGES.

(a).—*Third class carriages (broad and metre).*—Five per cent. on each line to have their interior fittings easily removable. End doors 3' wide with small falling platforms and side openings for the entrance of doolies.

II.—GOODS WAGONS.

(a).—*Low-sided stock (broad).*—The minimum length to be 18' 8" (sufficient to carry four pairs of gun wheels), width 8'; falling ends, and falling sides, with a minimum width of door 8'.

" The platform and timber trucks, of which there are 820, only require temporary boarding over the buffer space to complete them as suitable for end loading."

" *Metre-gauge.*—A minimum length of 13' 6" by 6' with both sides and ends to let down."

(b).—*High-sided open trucks.*—The minimum length 15' 8", the minimum width 7' 8", end openings, and a side entrance of 7' in the clear, certain fittings by which the height of side can be raised temporarily to 4' 6" for the carriage of horses.

" *Metre-gauge.*—The high-sided wagons so called do not correspond with this class."

(c).—*Covered goods wagons.*—Each wagon should be capable of carrying 8 horses unsaddled, heads inwards, with a good space in the centre for troopers, saddles, forage, &c.

" The minimum dimensions required are 18' long by 8' wide, a height of roof 7', and a door 6' 3" high by 5' 6" wide. Windows, ventilators and fittings for supporting seats, suspending stretchers and fastening horses."

" *Metre-gauge.*—The most important point, the height of door 6' 3", already exists in the converted cattle-trucks, but in the covered goods wagons the height is only 5' 6". This is a point requiring attention, for as soon as the alteration takes place, the power to carry horses and large cattle will be very largely increased (para. 7 ante)."

(d).—*Horse-boxes.*—The present style of horse-box in India is capable of improvement. The side flaps are most unwidely, and there are no means for cleaning the stalls on a long journey.

" The present double horse-boxes could be made to carry 8 transversely, and the single horse-boxes 5, instead of 6 and 3, longitudinally, and with doors more easily opened, greater cleanliness could be ensured. Any single horse could be led out without disturbing the others, and if a platform was not available on the head side, a station ramp would meet every purpose."

" *Metre-gauge.*—The horses must travel parallel to the rails; the box should carry 4, and leave a space in the centre for grooms and forage."

" 8. To adapt then the existing rolling stock in India to our possible military needs, it will be seen that considerable changes have to be effected, involving not so much any large immediate outlay as a careful consideration of the manner in which these alterations can best be carried out."

" Before issuing any definite proposals, I consider that many of the points and difficulties which must necessarily arise on the introduction of such a general measure, can best be met and overcome by deputing an Officer of the Railway Department to visit the different Agencies and who, while keeping himself in communication with the military

authorities of the different Presidencies, shall, after personal interviews with the Agents and the Consulting Engineers of each line, and after an inspection of all classes of vehicles, prepare and submit from time to time, for approval, the necessary orders for conversion of rolling-stock as well as for the patterns of the new wagons."

" By this means each Company and State line, without sacrificing its commercial interests, will be enabled to adopt the designs for renewals so as to render the rolling-stock on all lines the same, and interchangeable without difficulty."

" 9. The instructions to this Officer should deal more particularly with the following heads :—"

- I.—Plans showing the alterations necessary to the existing stock their cost, and the rate at which the renewals would be carried out.
- II.—Designs for new stock, its cost, and the probable rate of its introduction
- III.—Designs for special stock, *viz.*, the cooking, surgery, necessary, dining, and commissariat, wagons of an ambulance train, relief wagons, in time of accidents, &c.
- IV.—Designs for the fittings necessary to adapt the present stock for the conveyance of sick, wounded, horses, &c.
- V.—The extent to which particular types of stock can be reduced.
- VI.—The surplus or deficiency of any class of stock on any line.
- VII.—Marking such of the present stock as is suitable for military traffic,
- VIII.—The preparation of military time-tables for the concentration of troops.

and all such other points, *viz.*, uniformity in the method of working signals, nomenclature of vehicles, sufficiency of sidings, shed protection at large termini, mutual responsibilities of Railway and Military officers, a greater economy in the haulage of troops, &c., &c., as would facilitate a rapid concentration of troops at any particular point on the railway system.

" 10. To give effect to the above, I would, with your Excellency's approval, select Major A. LeMessurier, R. E., for this duty, who has shown great ability and energy in preparing and collecting the valuable information contained in the reports and papers I have had under notice."

" 11. While this Officer is making his preliminary enquiries, a copy of this note might be forwarded to the Secretary of State, with a request that the co-operation of the Board of Directors may be invited, so that the suggestions offered by these Committees may receive practical effect."

These proposals received the approval of His Excellency the Viceroy, on 13th March 1877.

I will now endeavour to explain the practical effect that has been given to the views impressed in foregoing
Adaption of Rolling Stock, minute bearing in mind that commercial interests are not always identical with Military requirements.

Our arrangements for military transport in time of peace, however, are not yet quite perfect, inasmuch as at Bellary on the 4th and 5th February last, when the right half battalion, 43rd Light Infantry, was moved to Madras, 306 miles, it appears in the first place that sufficient rolling stock was not provided and baggage had to be loaded into Coke wagons.

At Gooty, the baggage was transferred to other trucks, involving a delay of 5 hours, and on arrival at Arconum, the women and children had been fasting since 1 o'clock the previous day, 23 hours, and on arrival at Madras the men had received but one-half ration, between 7 P. M. on Monday, and 8 A. M. on Wednesday, or during 37 hours.

Troops in India have practically 3 different scales of equipment, viz :—

For ordinary movements

For Inland active service and

For active service beyond the frontier. -

The number of servants, tents, baggage, &c., varying in every instance.

It is necessary to remember that if each tactical unit is to be moved with its baggage complete, the numbers to be carried, and the gross loads, must be brought within the capacity of a train and the power of a locomotive to haul it.

As regards the conveyance of the sick and wounded we have no such Order in India as that of the Knights of Malta, with its continental branches, for the aid of the sick and wounded in war. In the event of hostilities the Austrian order of the knights of St. John have promised to place at the disposal of their Government 12 ambulance trains complete to the most minute detail with a trained staff, instruments and stores for the conveyance by rail of sick and wounded, from Field Hospital, near the scene of action, to the interior.

One such train is stabled at Strakonitz station in Bohemia, and there every year the Knights, Surgeons, sick orderlies and cooks assemble for a course of instruction. This ambulance train consists of a carriage for the Commandant and Doctors, provision, cooking, dining and store wagons and 10 Field Hospital wagons—the Locomotive, Teuder and Brakes being provided by the several Railway Companies.

This Order also possesses a Field Hospital train of 12 carriages and 2 field cooking wagons, to convey the men as they arrive by train from the front at the Railway stations to the Hospital in the interior off the line.

Although we cannot expect such assistance we can by diligence and attention secure results equal to those attained on the Louis Hesse Railway, when in 1870-71, the management turned out from the ordinary stock of the line a complete train of 28 vehicles at Mayence in 10 days, and carried in 7 long trips 1466 wounded and sick.

In forming our Hospital trains for India—three things should be borne in mind.

To use the vehicles immediately available.

To lose the least time possible, and

To incur the least expense.

Adopting these principles, I will now proceed to detail the arrangements that are in progress, taking first the passenger stock and the method of its transformation for the conveyance of the sick and wounded.

First class carriages, or others fitted with leather padding, are not to be used on account of the difficulty in purifying them after their use by the sick and on account of the risk of infection.

The model before me is intended to represent the box *3rd class carriage* of the type in ordinary use, having 5 compartments with side doors, a double roof and sunshades: when such a carriage is adapted and ready for use in time of sick relief or war, it is distinguished by its color (buff) and the Geneva cross on its side.

The adaptation is secured in the following manner:—

When notice is sent that such a carriage is required for sick transport, it will be run into the nearest shops for alteration.

The side doors are opened and the workmen enter.

The central-end doors are opened and dooly-doors are made ready by throwing back the unbolted panels next to the side door at the end.

The fastenings by which the seats are secured to the floor and sides are then unscrewed and the seats themselves removed bodily.

The box is then empty and ready at a small cost to receive any fittings to make the carriage suit any of the purposes that the necessities of the occasion may demand.

The above is based on a specification prepared by Mr. Pearce, the Carriage and Wagon Superintendent, E. I. R. who is of opinion, that neither the life or the strength of the vehicle is affected by such dismantling.

Sick fittings may consist of standards, springs on the floor, or suspenders from the roof, all fitting into sockets ready for them.

This model shews the standards, this the springs, and here are the slings, and the stretchers.

The stretchers carrying the patients are entered by the dooly doors and deposited in their proper places.

The side doors are closed, and the ambulance is ready loaded, containing 10 men lying down, seats for others, and a clear passage through the carriage of 3 feet between the stretchers.

Single vehicles so arranged and not exceeding 4 in number, could be attached under the Regulations to any ordinary passenger train, on payment of 9 annas per mile for each vehicle, and I offer this for the consideration of Medical Officers, as a suitable and cheap conveyance for invalids during the annual sick reliefs.

When, however, large parties of invalids are to be dispatched on long journeys, the conditions of their transport would approach closely to those of the sick and wounded in time of war, in requiring additional and special wagons on the train to complete the equipment and to render the passengers independent of all extraneous assistance. The principle of the adaptation of the stock still holds good, for so soon as the 3rd class carriages have been gutted, some would receive the standards and springs, &c. and others the fittings which have been designed to transform the empty boxes into store, provision, cooking and dining wagons as required.

The strength of such an ambulance train being specified by the administrative or military authority, it would simply rest with the railway executive to fit up the requisite number of vehicles according to the standards laid down.

An ambulance train would ordinarily be represented by:—

An Engine and Tender provided by the Railway Companies, a front brake also provided by the Railway.

1 1st class for Surgeons.

10 3rd class with standards, &c. for the sick and wounded (100).

1 Cooking wagon with provisions and bed, for the cook.

1 Store wagon.

10 3rd class for the sick, 100.

A rear brake provided by the railway company, or in all 25 vehicles, exclusive of brake vans with beds for 200 lying down, besides sitting accomodation in the different carriages.

Nine vehicles purchased from the E. I. R. are now under conversion at Lahore, as types of the different ambulance and special carriages which are likely to be called for by the Military under every emergency. As soon as they have been practically tested, the fittings will be returned to store and the vehicles dismissed for ordinary traffic on the I. V. R. Duplicates of such patterns being made up to the extent which the Military Department may think proper to specify.

Covered Goods Wagons, We now come to the goods stock, selecting those as being most in use.

You have seen the old type, the new type is made somewhat longer, a little broader, has ventilation and certain fittings. It is designed nearly in accordance with a plan of Mr. Carroll's the Loco. Supdt. B. B. and C. I. R. and will accommodate any of the following :—

24 men.

8 horses.

12 ponies.

18 E. P. tents.

36 sepoyas pâls, Half company.

375 E. P. kits.

680 Sepoys kits.

150 Native Cavalry kits.

7 days rations for 1 Squadron Cavalry,

9 " R. H. A., half Battery.

10 " R. A.

9 " British Infantry, Wing.

8 " Native Infantry Regiment.

or 1 ton of hay as ordinarily packed in India.

When in ordinary use for commercial purposes, this wagon resembles a closed box like any other goods wagon but carries at the same time the fittings necessary for its conversion to military purposes, viz., 4 rings at the sides and 2 breast bars suspended at the ends near the roof. When required for military use, the doors are opened and the side ventilators are hooked up to the roof, the breast bars are taken down and made ready for fixing in position.

A few words are necessary in reference to the manner of opening these shutters. If they are hinged from the top and open outwards, the

extent of such opening could not exceed 9 inches, for the maximum width for a roof or over hanging portions is fixed at $10\frac{1}{2}$ feet. In this position also they would prevent the upper flaps of the door from being properly thrown back. If they are hinged from the bottom and open outwards to hang down, there will be difficulty in closing them at any time from the inside, and they will also be in the way of the door flaps folding back. If they are made to hinge from the bottom and open inwards, they would, if partly open, interfere with the proper suspension of doolies, should the wagon at a time of great emergency be required as an ambulance, and if opened completely so as to hang down inside, the space for the horses would be seriously curtailed and if the wagon was full of horses, the shutter from this position could not be closed.

There only remains therefore the hinging from the top and opening inwards, and keeping it out of the way by hooking it up to the roof.

One plan I may mention, adopted in Russia, seems a good one, viz: to cut out a piece of the side planking to the size required, and have sliding windows inside to fit over the opening. When the wagon is required for the carriage of goods, the movable board is fitted into position, and the sliding windows are drawn over it from the inside and fastened, when the wagon is required with its ventilators, for the transport of horses the two windows are slid back and the board is removed, leaving the space cut out from the side panels quite open to the air. (Brussels Report Para. 51c.)

The door itself is made in 3 pieces, the lower portion when open forming a flap to assist as a loading board, and when shut as a side of sufficient height to keep the horses secure. The central space between the breast bars is available for syces and harness, saddles, forage, &c.

There is yet another use to which the covered goods wagon can, with a little trouble be made available to meet large increases of passenger traffic. In India, there are periodical fairs, and religious gatherings, when numbers out of all proportion to the passenger stock available, demand transport without cessation during a week or 10 days at a time. Also at certain seasons there is a regular stream of emigrants from Bengal towards Assam, and if the adaptation of the covered goods wagon can be made to satisfy such abnormal wants in times of peace, we shall have every thing to hand for the time of war. The arrangement is most simple and is adopted in France.

Four templates of wood are fixed to the sides of the covered goods wagon inside, of such a shape, as to admit of 3 planks being placed transversely for seats, and one vertically to form a back in each half of the wagon. There are then 6 seats, sitting 5 each or 30 in all, with an ample space for the bundles and bedding of the native pilgrims and emigrants, or for the havresacks and side arms of the soldiers. These planks, 8 in all, being retained in iron grooves at the ends of the wagon, when not required for passengers, as movable

fittings. It simply means, that by providing 8 movable flanks, and 4 fixed templates, ordinary covered goods wagons can be converted in 5 minutes into passenger vehicles, giving sitting down accommodation for 30 people on occasions of exceptional traffic.

The low-sided or open truck, also is of universal use, not only for the engineering purposes of construction, but for ordinary traffic, in grain, seeds, coal, iron, rails, &c.

By making their sides to fall, every facility is obtained for loading guns and military wagons direct from the ordinary platforms, and by making their ends to fall, we can form them into a train, having a continuous platform open from end to end so that guns may be run up by means of ramps, without any delay and independently of the station platforms altogether. Such a train may be split in to any number of sections, and loading may go on simultaneously at the several points of such a line of trucks.

An open truck $15\frac{1}{2}$ feet long, will take 3 pairs of wheels, viz.— 1 gun, 1 limber and ammunition wagon body, or one pontoon wagon, or one wire (telegraph) Wagon. Open wagons $18' 8''$ long and upwards, will take 4 pairs of wheels, while Rail trucks $22' 0''$ will take 5 pairs of wheels, and are specially suited for carrying siege guns.

These open trucks also in time of emergency can be fitted with uprights and cross bars for the carriage of horses, and those who may have witnessed the transport arrangements in Egypt during the Abyssinian campaign will admit that fittings of any thing but a substantial nature will suffice.

Ammunition is always carried in powder vans a class of vehicle numbering only 79 in India. Of these 46 belong to the lines north of Jubbulpore, and after deducting those under repair, sufficient would not remain if any large movement of troops with explosive ordnance stores ever took place. Iron covered wagons with well fitting locked doors may be used under certain precautions for gun-powder, while breech loading cartridges in specially constructed boxes may be carried without risk, and gun ammunition in limbers and wagons may be transported in open trucks if carefully protected by tarpaulins.

All these particulars may appear tedious, but it is better to explain the capabilities of the rolling stock than to let the authorities remain in ignorance of what the railway is really able to undertake. A case occurred very lately which supports this view.

On the 16th May last, the B. I. S. N. Company's S. S. Chanda, left Calcutta for Madras with 6, 12 ton guns, 1400 projectiles each weighing about 250 lbs. and 25 tons of gun-powder. The Advantage of Railway not recognised. freight to be paid was 6,000 Rs. The guns were taken past Madras and

ultimately reached their destination by rail via Bombay at a further cost of Rs. 5,675.

The Calcutta papers at the time condemned the action of Government and assumed that the E. I. R. had not sufficient rolling stock to carry the guns within a reasonable time.

Had an official application been made to the Railway Company, by the Superintendent of Marine, it would have been learnt that four trucks to carry 16 tons each and one to carry 12 tons were ready, and that in a few hours, others could have been fitted up to carry a large number of heavy guns. Delivery could have been made at Madras within 7 days and the charge via the Dhond and Manmad line would not have exceeded Rs. 14,500.

But this payment to the Guaranteed Railway Companies represents more than the actual cost of such transit to Government. The several lines would have received about—

E. I. R.	6,800	Rs.	} 14,500 and their respective profits would
G. I. P. R.	4,500	"	
Madras	3,200	"	

have been Rs. 4,700, Rs. 2,600 Rs. 800 on the job, of which half, from the first two and the whole from the last or in all Rs. 4,450 would have eventually been returned to the Treasury leaving Rs. 10,000 as the net cost of the work to be done.

The despatch of these guns, &c., by rail might have been arranged by ordering a train under the conditions applicable to "Military Specials" within a price of Rs. 9,000 of which 2,500 Rs. would have returned to Government leaving the actual cost (Rs. 6,149) at very nearly the same figure at which the consignors had elected the sea route with its attendant risks and contingencies.

I have already said that 6,000 Rs. was the freight by sea to Madras and Rs. 5,675 as the rail carriage from Bombay. Of this last sum 4,000 Rs. nearly represents the net cost to Government of the transport by rail making with the sea freight 10,000 Rs. and if to this some allowance is made for the extra sea voyage beyond Madras to Bombay the bill will probably amount to Rs. 15,000.

The necessity for drill is fully recognised, and His Excellency the Commander-in-Chief in India has in contemplation a scheme for supplying each important military station on the line of rail, with box wagons, similar to those in use on the Railways, so that all arms of the service may become thoroughly acquainted with the capacity of each wagon and the manner of its loading, for horses, guns, baggage and camp equipage. The Commander-in-Chief at Madras also proposes to practice periodically, mounted troops in similar duties at the different Railway stations

The manner of loading has now been decided on, it remains merely to compile Manuals of instruction for each Manual of Instruction. arm, shewing how the loading is accomplished, similar to the small pamphlets now issued to the troops in Belgium, and which have already been submitted to the Quarter-Master General's Department.

Sir A. Clarke is anxious to establish a Military Railway Corps and Military Railway Corps. a Committee is at the present time assembled at Simla to consider how this may best be accomplished the object being to maintain a body of soldiers trained in all the branches of railway business so that in time of war lines may be constructed or worked as required. In time of peace such a corps would form a small reserve from which assistance could be given to the Civil Agencies to meet a sudden expansion of traffic, without experiencing the evil effects which would arise from the discharge of employés when the traffic returned to its natural limits.

Having explained in detail the work that is in hand let me turn to other points of a more general character.

The troops despatched to Bombay from Northern India for the Actual results in 1878. Mediterranean consisted of 3 Regiments Native Infantry and 3 Squadrons of Native Cavalry. The movement commenced at 5 p. m. on the 21st of April.

Journies generally were undertaken at night so that the troops should halt during the heat of the day at the rest camps which had been established at Toondla, Etawah, Allahabad, Jubbulpore, Sohagpore Khundwa and Egutpoora. (The starting points are shown on the map by blue flags and the rest camps by red.)

At Jubbulpore the train loads which had been run over the E.I.R. were reduced to suit the heavier gradients of the G. I. P. R. and the movement was completed without casualty at 9 a. m. on 1st May.

This appears all very easy and satisfactory but let me endeavour with the information at hand to follow the programme under which the arrangements for this transport had to be prepared.

The Quarter Master General having roughly sketched out his plan of operations placed himself in communication with the Railway authorities.

The action of the O. and R. Railway was limited to the transport of a detachment from Shahjehanpur to Cawnpore (148 miles) but the Agent, Colonel Jenkins had readily engaged to meet any and all demands that might be made upon him.

In reference to the main line, the Quarter Master General in India had prepared an approximate Time Table for night running at a through

speed of 18 miles an hour north of Allahabad and 15 miles an hour south of Allahabad to Bombay with suitable halts every 3 hours.

Mr. Ross Traffic Manager at Lahore submitted 3 Time Bills, which after slight alterations were accepted.

100 covered goods wagons were also put under alteration for the conveyance of horses. The S. P. and D. R at the same time reported themselves ready (if covered goods stock was used) to despatch 460 horses on 24 hours notice and 235 ponies within 12 hours from Umballa. This calculation was made at 4 horses a wagon or half the real load so the extent to which this line could have provided carriage may safely be doubled.

The approximate Time Table, with a Memo shewing the composition of the trains was sent on the 8th April by the Quarter Master General to Mr. Batchelor the Traffic Manager with a request that after it had been adopted to suit the local train service of the E. I. R., the result should be forwarded to Mr. Conder for the completion over the G. I. P. R.

The through trains from the S. P. and D. R. were timed to stop 20 minutes at Ghaziabad, 15 at Toondla, 10 at Etawah, and 15 at Cawnpore.

Fifteen minutes was also given at Cawnpore for the E. I. R. trains from Agra.

The E. I. R. could only promise to provide carriages for 551 horses and 316 ponies on 5 days notice while employing horse boxes, cattle trucks and coke wagons,

Mr. Batchelor in forwarding his Abstract of through running to Mr. Conder on the 13th April omitted to repeat the injunction of the Quarter Master General that halts of from 15 to 30 minutes were necessary every 3 hours.

Mr. Conder arranged to divide all trains at Jubbulpore and although the loads were lightened, speed for the Cavalry was not accelerated beyond that of a goods train.

Mr. Conder having settled his trains, issued a special Time Bill on the 20th April.

At the same time it became known that the Bombay Government required the whole of the Cavalry to assemble at Eguptura by the 29th April and the Quarter Master Geueral in India telegraphed to the Railway Companies enquiring if it was possible to send the pairs (3) of squadron trains in groups i. e. within half an hour of each other. The S. P. and D. R. and G. I. P. R. replied that such could be arranged, but some difficulty arose with the E. I. R. who could only promise to

forward a squadron of cavalry daily in 2 trains but would do their best to run 3 trains.

The Quarter Master General thereupon telegraphed on 22nd April that no changes need be made and the movement having already commenced on 21st April was carried out very nearly under the time bills as published.

These preliminaries would undoubtedly have been much facilitated if a traffic official conversant with the capabilities of the different lines had been summoned to some central station where in personal communication with the Quarter Master General he could have learnt the strength of the trains required and settled their through running direct with the Companies. This plan might be resorted to in future on the eve of any important movement with advantage to the services concerned.

The Infantry travelled with Camp equipage, Tents, Regulation service kit, Followers, Hospital Establishment, sick carriage and stores complete and 200 rounds of service ammunition per man.

The 31st P N. I.* and 2nd Goorkhas† occupied the same number
 * 964 miles for Rs. 19,947. of vehicles 34 including brakes at a cost of
 † 1320 miles for Rs. 25,718. about Rs. 20 per mile each. The loading of
 the Goorkhas was however the more perfect of the two, for their baggage, &c., was accommodated in 4 goods wagons while that of the P. N. I. occupied 7. This careful loading resulted in a less expenditure of Rs. 1,990 for the Goorkha transport and brought the number of their vehicles within a maximum load of a troop train (33 vehicles and 2 brakes).

The 13th N. I.* occupied 19 carriages for 637 souls at a cost of
 * 1122 miles for 20,529 Rs. about Rs. 18 per mile. The N. C. O.'s and men had only authorised accommodation 536 seats for 535 men but the followers had more than double the room they were entitled to, probably to save delay in taking off carriages. The baggage in this case was packed beforehand in 6 covered goods and the brakes ran empty. Two 3rd class and 2 covered goods could have been cut off but it is possible that this train was calculated for the whole Regiment. The rolling stock provided for the N. I. was from the E. I. R. while the Goorkhas used that of the S. P. and D. R.

The Cavalry travelled with Private, Regimental, and Hospital followers. Baggage and baggage animals Camp equipage, saddles and line gear complete, and ammunition at 100 rounds per man.

Officers' syces went with their horses. Two Sowars in each horse wagon and 4 Grass-cutters in each cattle wagon. 2 Chunda horses were taken per troop.

* 2 Squadrons 9th B. C. Each Squadron* may be said to have
 1252 miles for Rs. 46,429. taken 2 Trains of 21 and 23 vehicles or 44
 1 Squadron 10th B. L. in all costing about 19 Rs. a mile.
 1370 miles for Rs. 26,478.

The train loads were not economical. Two of the trains for the 9th Bengal Cavalry from Meerut were under the minimum of 22 vehicles including brakes fixed for "extra troops trains" and all were extremely light. A light load should secure a rapid journey but as $\frac{2}{3}$ of a cavalry train consists of goods wagons its speed is restricted to that of a mixed train varying from 14 to 17 miles an hour.

For the men and followers 6 compartments were to spare in No. VI train and 7 in VII, a single horse box would have been sufficient in IV and 1 Double horse box in No. VII train. On an average 9 ponies for each wagon should have been increased to 10.

If the two Detachments of the 1st Squadron had been carried in one train of 40 vehicles the saving would have been Rs. 2,345 and similarly the charge for the 2nd Squadron might also have been reduced by Rs. 3,862.

A Detachment* of the 5th Troop 9th Bengal Cavalry was also despatched for special reasons from Agra at 5 P. M. on 24th April to catch the trains of the 2nd Squadron at Allahabad. This detachment travelled in 12 vehicles and as 20 is the fixed minimum number of vehicles for a troop train, the cost of haulage to Allahabad was Rs. 469 more than necessary (3 annas a mile being the rate charged per mile per vehicle less than the minimum).

With the 10th Bengal Lancers 2 brake vans were run empty, one covered wagon per troop should have been sufficient to take all the baggage, and the ammunition might have been transferred at Meerut into the Powder Van of No. IV Train.

The rolling stock used for the cavalry was taken from the S. P. & D. R. and 100 covered goods wagons were altered for the purpose at a cost of Rs. 2,750.

This movement by railway may be approximately estimated as costing for the

	Rs.
31st P. N. I.	19,947
13th N. I.	20,529
2nd P. W. O. Goorkhas	25,718
{ 9th Bengal Cavalry,	24,920 } 46,429
Detachment (5th Troop)	21,509
Squadron, 10th B. L.	4,789
Alteration of Carriages	26,478
	<hr/>
Total Rs.	<hr/> 1,46,640

which I have endeavoured to shew by careful loading on approved principles might have been reduced by
* 81st P. N. I.... 1,447
13th N. I ... 2,616
9th B. C. { 2,345
{ 3,862 } 6,207
Detachment 607
10th B. L. 5,944
<hr/>
16,821

Suitable halts in actual running were made by all the S. P. & D. R. trains and an average speed of 19 miles an hour was maintained.

At Umballa although the departure of the 1st train for the 10th Bengal Lancers was timed for 9-15 A. M., and that of the 2nd for 12-15, the squadron completely equipped was marched to the station at 6 A. M., on the 25th, and commenced embarking by troops at the troop platform. 67 horses of the first troop were embarked in 8 minutes, 37 baggage ponies in 8 minutes and the camp equipage and equipment were stowed in 15 minutes. The detention before the 2nd troop started was too great and the presence moreover of the detachment before it was wanted was likely to cause confusion.

In despatching troops by rail it would appear to be nearly as great an error to allow too much time as too little and in a Memo. on Railway Transport recently prepared at the Horse Guards, Cavalry trains are supposed to be loaded in 1 hour and the detachments do not enter the station yard until the precise moment laid down in the Time Table.

The halts on the G. I. P. Railway were not altogether satisfactory. From Jubbulpore to Sohagpore, 123 miles in 9 hours, 5 trains waited for 8 and 10 minutes. From Sohagpore to Khundwa 141 miles in 10½ hours, 15 trains stopped for 12 minutes and 5 trains for 10 and 8 minutes. From Khundwa to Egutpura 268 miles in 18½ hours, there were 3 halts of 10, 50 and 10 minutes.

These halts were neither sufficient nor at proper times and the inconvenience would have been most seriously felt had the trains been occupied by European troops, as it happened no refreshments could have been obtained, the men could not have even stretched themselves nor could the horses have been sufficiently watered.

There can be no doubt that the speed over the G. I. P. R. could have been accelerated and it is probable that had Mr. Conder known that the cavalry trains were being run over the E. I. R. by "Troops," and not by "Squadrons" he would have arranged to take them through without dividing them. In fact, in 1873, Mr. Conder recommended that troop trains of 32 vehicles should be run over this very section at 14 miles an hour.

If all the circumstances attending this movement be considered, that it took place during the hottest time of the year, that it was carried out on short notice and with great secrecy, that 3,082 officers and men 716 horses, ponies, and bullocks; 3,131 maunds (115 tons) of baggage, equipage, ammunition, saddle and line gear, were conveyed in 240 vehicles, over distances varying from 961 to 1370 miles between the 21st of April and 1st May, within 9½ days including halts, without losing a man or horse at a cost of Rs. 1,46,640 and without interfering with ordinary traffic, or the transport of the troops from other parts of India, there is no doubt that great forethought must have been exercised in its preliminary details and an admirable co-operation maintained among all those connected with its execution.

The Railway branch of the P. W. Department has prepared returns shewing the number and capacity of all Rolling Stock Returns. classes of rolling stock in India and laid down certain principles for the conversion of stock to meet not only the ordinary but the emergent wants of military movements.

These have been accepted by the Guaranteed Railway Companies and are adopted on State Lines. With time the number of vehicles suitable for the sick, horses, and stores will increase, and the Railways will be in a position to carry all that offers on due notice being given them.

Troop transport by rail has been well started and in case false impressions exist, I may state that the difficulties which have been experienced in obtaining a stand point and initiating the necessary improvement, were attributable only in a very small degree to the Railway Companies.

It now remains more with the Military Department to complete the work in its many details, viz., Conclusion.

To secure expedition by a system of training and drill,
to save confusion by publishing approved plans of loading all kinds of guns, stores and material,
to save expense by deciding on the units of movement and
to combine the action of the Railway authorities with their own by including the Troop Trains in the ordinary time tables.

These being done, no matter how sudden the call, the order is sent for troops to move, the railway is warned, the rolling stock is ready, the trains run to stated times, the men cattle and stores are well protected, while the worry and anxiety attendant on working out and adjusting the preliminary arrangements is reduced to the mere technical labor of compiling certain data from books of reference.

IV.

STUDIES ON MILITARY TRANSPORT.

By BREVET MAJOR G. A. FURSE, 42ND ROYAL HIGHLAND REGT.

"Le service des transports aux armées est un des plus importants pour le succès des opérations militaires ; si ce service manque, tout manque avec lui ; c'est par cette raison que les meilleurs généraux sont ces qui se sont occupés des moyens de l'assurer avant d'entrer en campagne."

(Dupré d'Aulnay et Quillet.)

MILITARY TRANSPORT.

Military Transport is the means by which an army in the field is enabled to move with all that is necessary for its subsistence and efficiency.

On account of the variety and immensity of the requirements which it has to look after, it assumes an importance that might be decisive in the operations of a campaign.

Transport is required for a number of articles, the principal being food, forage, ammunition, sick and wounded, baggage, medical comforts, entrenching tools, treasure, tents, material, clothing, &c.

Railways are of invaluable use in transporting men and stores in time of war. They offer the most complete and rapid means for conveying troops, provisions, and war matériel ; they facilitate the supply of the daily wants of an army, and thus impart to it a considerably increased freedom ; still, no amount of railways can do away with a regular transport corps. Colonel Hamley, in his *Operations of War*, says : "The operations of Army Transport in the form of horse and vehicles will be confined to the space between the dépôts formed on the railways and the front of the army."

The importance of military transport increases therefore in proportion as we approach the enemy, until it becomes the only means of transport that can be used.

Railways should not be employed exclusively in war, but in combination with the ordinary roads of the country, for, on account of the facility with which they can be destroyed or rendered temporarily impracticable, they cannot be used as the only roads of communication. It is owing to this weak point of theirs and on account of their number being small, when compared to the ordinary roads, that the importance of these last as lines of communication, has in no way diminished since the introduction of railways.

Rustow, in this *L'Art Militaire au XIX^e Siècle*, says: "Whatever may be the services that railways can render, it is clear that one should not neglect to organize for war the transport of an army because railways are easily destroyed, because their employment may be interrupted by the existence of fortified places, because at last these means of transport are indispensable for the troops when compelled to quit a railway line."

One of the most important advantages obtained by the employment of railways in war is the ease with which these enable a large army to be mobilized and concentrated in a few days. Of two armies equal in every other respect, the one which can first effect its concentration must undoubtedly gain important strategical advantages. This ease and rapidity of concentration is denied to us by our insular position, for the time to convey a force from the port of embarkation to a distant shore is considerable. The rate of movement of good steamers cannot be calculated at more than 250 miles per diem, whilst contrary winds and stormy weather have their effect in retarding their progress. Railways moving at a speed of twenty miles per hour can run over a distance of 480 miles in the 24 hours. These also run generally pretty direct from one point to another; whilst ships have to go round many hundred miles of coast, which increases the duration of their journey. Our army can only concentrate on the coast after landing; it cannot impede the concentration of the enemy's forces in any way, and he will have the further advantage of being able to move forward and occupy the most important strategical points in the theatre of war. If this is intersected by Railways, our disembarkation must take place at some port which is the terminus of a railway line, that the troops may be pushed forward by rail; hence the real concentration does not take place until a point is reached on some railway line where, safe from attack, the troops can gather together.

A glance, however, at the following table of wars and military expeditions in which England has been engaged since the close of the Napoleonic wars, will at once show that most of her warlike operations have been carried out either against savages or badly organized armies, in countries generally wanting in good roads, and where the name even of a railway was unknown:—

Country.	Year.
Nepaul ...	1815
Mahratta ...	1817
Burmah ...	1824
Bhurtapore, siege of ...	1825
Afghanistan ...	1839-42
China ...	1842
Hydrabad, Sind ...	1843
Gwalior ...	1843
South Mahratta Country ...	1845
Punjab (Sutlej) ...	1845
Punjab ...	1848
Forcing of Kohat Pass ...	1850
Expedition against Oormuzai Wuzeerees ...	1851
Burmah ...	1852
Expedition against Oormuzai and Akazai Tribes ...	1852, 1853
Boori Pass... ...	1853
Caffre ...	{ 1846-47 1850-53
Expedition against Mitchnee Momunds ...	1854
Crimea ...	1854-56
Expedition against Sonthal Tribes ...	1855
Expedition against Busseekhel Afreedies ...	1855
Persia ...	1856-57
Expedition against Bozdar Tribe ...	1857
Indian Mutiny ...	1857-59
Expedition in Eusofzai Country ...	1858
South China ...	1858
Expedition against Cabul Kheyl Wuzeerees ...	1859
North China ...	1860
Expedition against Mashood Wuzeerces ...	1860
Expedition in Jynteah Hills ...	1862
New Zealand ...	1861-65
Sittana Expedition ...	1863
Bhootan Expedition ...	1864
Abyssinia ...	1867-68
Expedition to Black Mountain ...	1868
Do. against Bezotees ...	1869
Do. against Cabul Kheyl and Taza Kheyl ...	1869
Red River Expedition ...	1870
Looshai do. ...	1871-72
Gold Coast, Ashantee ...	1873-74
Duffa Expedition ...	1874-75
Perak ...	1875

Most of these countries were entirely wanting in the means of subsistence required for a large force, and in many the climate was injurious to the European soldiers ; hence our transport corps had to be formed on a very large scale, and was often raised at a very short notice, owing to the impossibility of delaying the operations on account of the climate. In campaigning in unhealthy climates,* the soldier

* In the *Abyssinian Campaign, &c.*, by Colonel G. T. Haly, late of the 108th Foot (Smith, Elder, and Co.), will be found some useful hints for the management of troops in the field in unhealthy localities.

must also be well nourished ; for, if badly or insufficiently fed, he will be more prone to succumb to the epidemics of the country.

In most of these expeditions the problem to solve was, how to convey a certain force to a determined point. It was principally a pure question of nicety of arrangements, how best to forward supplies with the force to enable it to exist and accomplish its mission with the least possible delay, so as to derive all the advantages of the good season, in which, only, the military operations could be carried out.

The result of the fighting was not apprehended, as it was reasonable to expect it to be favourable to the best organized, disciplined, and armed force. The difficulty was at times to bring the enemy to an engagement, imbued as he generally was with a dread of the superiority of the European, and proud of the difficult nature of his country.*

A rapid and continuous forward movement was a great element of success—always to anticipate the enemy, who, for want of organization, was generally slow to follow up an advantage with rapidity, to harass him from place to place, destroy his stores and supplies, and oblige him to break up and scatter for want of food.

Mr. Fox, in his account of the war in New Zealand, justly remarks : " What we had to convince them of was, that we were better soldiers, personally, than they were ; that our force was irresistible ; and that, with our superior training and armament, they had no chance of resistance. Short, sharp, and decisive operations were what were wanted, in order to convey to the minds of the natives, not only those engaged in the conflict, but to those at a distance who sympathized with them, the moral conviction that we were their masters."

This could only be obtained by a well-organized and sufficient transport. At Umbeyla a rapid advance, at first, might have interfered with the rising of the hill tribes, but there was no proper transport ; hence the troops were delayed, and the numbers of the enemy greatly augmented. In the Waikato campaign in New Zealand, after the skirmish at Kohera on the 17th July, 1863, the troops remained for fifteen weeks without making a forward movement, though the enemy's advanced posts were only three miles off. For, though for the previous two years a war in that district had appeared to all almost inevitable, the proper means of transport had not been provided beforehand.

* We should abstain from drawing any unjust conclusions from our easy victories over Asiatic or other irregularly organized armies, for the same tactics which have led to a successful result when employed against them would lead to disaster when opposed to a better organized and equipped enemy. The improvements in modern arms have also been greatly to their advantage ; we are generally compelled to assume the offensive and drive them from their positions, and the attack of a position defended by a resolute enemy armed with breech-loading arms is now a much more difficult operation than it used to be.

Again : In Ashantee our movements were slow. Had our small army been able to push on to the capital immediately after the arrival on the Prah of the envoy from Coomassie, there might have been no fighting at all, and the king, unable to assemble his men in time, would have no doubt agreed to the terms Sir Garnet Wolseley proposed before attacking his army at Amoaful. Here again want of sufficient transport delayed the troops, and a rapid advance was impossible.

No other country in our times has used such a variety of means for purposes of military transport. Elephants, camels, horses, mules, ponies, donkeys, bullocks, horse and mule wagons, bullock carts, carriers, &c., have all been utilized by us for land transport carriage. Indeed, we are rich in material from which to organize a proper efficient transport corps. Our political obligations, the safety of our colonial possessions, and, above all, our relations with many of our neighbouring States in the East, make it always uncertain at what moment we may be called to place an army in the field ; it is therefore more incumbent on us than any other military power to direct our attention to the organization of this most important branch of the military service.

DeGerlache, writing on the transport of an army, says : "The transport service is one of the most necessary for the success of an army and often even for its preservation. It is from it that she obtains her means of subsistence, all her baggage, all her ammunition, and finally by it that she retires without disorder or loss. The transport service is the soul of an army, because alone it gives her life and movement. It is an object which a wise administrator will not lose sight of for one moment, and to which he should devote particular attention, because the success of his operations, and consequently his honour, almost always depend upon it."

Sir J. Adye, in his account of the Sittana War, justly remarks : "It cannot be too constantly borne in mind that efficient transport is one essential element of success."

The wars of 1866 and 1870 and the rapid and signal successes of the German armies imparted a fresh impulse to the study of the art of war, and many of our officers have devoted much of their time to the study of strategy and tactics. Much that is written on these subjects applies principally to European warfare, where armies pretty well balanced in point of numbers, moving in a civilized country, and following the same principles of instruction, organization, and discipline, are opposed to each other; our military education requires, however, a somewhat different training, as our military expeditions and wars vary immensely from civilized warfare. The difficulties we have to contend with do not occur in European wars ; these are difficulties that cannot be surmounted alone by discipline and courage, but are to be met in the first place by judicious, well matured pre-arrangements, and afterwards

by the utmost amount of energy and self-sacrifice to be obtained from all ranks of the force engaged.

In the war in New Zealand, the difference of the operations conducted with Queen's troops, and those where colonial troops, aided by friendly natives, were engaged, showed painfully that our troops have much to learn in the art of fighting against savages. Our care of our troops occasionally is excessive, and naturally opposed to quick movements. In that war, a force of colonial troops and a friendly native contingent under Lieutenant Biggs went to attack the rebels at Kawa Kawa, and the rapidity and efficiency of their operations far surpassed anything that was done by the regulars during the war. Mr. Fox relates that after a long march, as the evening closed in, some of the men became disturbed at the want of provisions. He says: "About this time, some of the men are said to have asked the, under the circumstances, not unreasonable question, 'Where are we to sleep to-night?' Upon which Lieutenant Biggs is reported to have pointed to the pah ahead, and said that they had to 'make themselves quarters there,' which they did, driving the enemy out in gallant style."

The strength of our Home Transport is very small, and even during autumn manœuvres, its movements, in a country like England, are ill-suited to afford any instruction as to the requirements of an army making long marches through a difficult and poor country. This can only be obtained by personal observation, by collecting information from military despatches, departmental reports, and a careful study of the narratives of our expeditions and wars. Even these last are generally wanting in many interesting details which would only prove tedious to the general reader. The passages relating to transport and other matters of administration are few, and scattered throughout the books, and require patience and time to collect.

The raising of a transport corps at a short notice (for in many of the countries in which we may have to make war a new corps entirely will have to be raised) will always be a difficult undertaking; but the difficulty will be very much overcome by an attentive study of our former wars and expeditions, which will show how, by adopting a certain organization and following some fixed principles and rules, may be avoided the breaking down of our transport, which has occurred in many of our former military undertakings.

Such undeniable military authorities as Napoleon, the Duke of Wellington, Sir Charles Napier, &c., have all been in favour of a disciplined military transport. Speaking of the first, Marshal de St. Arnaud says: "The Emperor made up his mind, and the experience of a long war confirmed this conviction, that it is indispensable that armies should have a train organized on an exclusively military principle."

Sir Charles Napier says: "I am convinced that the baggage of an army can never be rendered properly movable, even in Europe or

America, still less in India, unless it is formed into a corps perfectly organized." Later on, Lord Strathnairn, on a report on transport, has the following words :—" I beg leave to record my convictions, founded on practical experience in India and the Crimea, and a careful study of all the bearings of military transport, that the idea of organizing a 'Train' of which all the elements would not be under military discipline is a fatal illusion."

A civil transport is condemned by most of the principal military authorities, who agree that the transport moving with the army should be a well-disciplined corps. This discipline, or the subjection to rules, order, and regulations, can only be obtained by giving the transport with the army a certain military organization. The regularity of any large body on the march is only obtained by practice, and by conforming to certain rules carefully laid down for all ranks. This practice forms a part of our drill, and to obtain the same regularity in the long transport columns, which encumber the rear of a moving army, certain fixed rules must be framed and observed, and these could only be observed by a body accustomed to discipline and obedience.

A civil transport is liable to panics, and requires a large number of troops to escort it. Civil labour is also costly ; it is, besides, a great object to obtain the actual control discipline holds over the soldier, which is not to be got from the civilians of the lower classes.

A civil transport train can, however, render important services when employed far in rear of the field army, as long as the men employed run no risk from the enemy's fire, and are not removed from the neighbourhood of their homes.

An army in the field requires two kinds of transport ; each, working under different circumstances, will differ greatly in its constitution.

The first is that portion of the transport which moves with the army itself. It conveys the regimental baggage, camp equipage, reserve ammunition, removes the sick and wounded, and brings forward supplies for men and animals for a limited number of days. This position, which is intimately connected with the troops, requires, by the admission of the highest military authorities, to have a military organization.

The second moves in rear of the active zone of operations ; it pushes forward the supplies of the army from the base to the most advanced magazines, and is generally out of reach of attack from the enemy. A military organization for this would be superfluous, and it generally will be found composed of auxiliary or indigenous companies.

In a matter of such vital importance as Army Transport, on which so much depends in actual war, the vexed point as to whether it ought to form a separate department for itself under the orders of the Quarter

Master General, or to be placed entirely under the sole control of the Commissariat Department, should be carefully considered.

Several weighty arguments are adduced by the advocates of both plans. These ought to receive the attention they demand, and ought to be considered in an impartial spirit for the good of the service, for the matter is of such grave importance that an early solution of the question will facilitate matters greatly on the breaking out of a war.

A certain amount of friction has been experienced in some of our wars by the placing of the late Military Train under the orders of the Commissariat Department. The officers of this department state that military men looked at their being placed under the Commissariat Department as a source of grievance, from which ensued evident passive resistance and want of cordial co-operation.

This complaint of want of cordial co-operation is not limited entirely to the officers of the army, but in reports on the Crimean, China, and New Zealand Wars the officers of the navy or naval transports have been accused of the same.

On the other hand, in the reports of Commissariat Officers one cannot fail to notice a latent jealousy of the Military rank possessed by the officers of the Military Train, and a certain amount of sensitiveness regarding their own position as non-combatant officers.

It is often stated that in the French army this feeling of want of co-operation between the Military and the Intendance or administrative branch does not exist. There is, however, one very important difference in the constitution of the French Intendance from our Commissariat, which seems to be generally lost sight of, and that is, that the officers of the Intendance are recruited from the army, from officers not under the rank of Captain, the preference being given to those of the Staff Corps; the tone of the department is very good, as most of the officers are former *élèves* of the Ecole Polytechnique and of St. Cyr. No feeling of the nature described above can therefore exist in the French service, any more than in the Indian service, where the Commissariat is entirely officered by commissioned officers from the army. The committee of officers sent to report on the French Intendance in 1855 remark : "The French attach great importance to the maintenance of the principle that all the administrators of the army should be chosen from among military officers ; they consider that such a regulation tends to produce harmony in the working of the military system."

Commissary General Turner, in forwarding Assistant Commissary General Robinson's report on the campaign in the north of China says: "It is folly to blink the fact that, as a rule of almost universal application, military officers will not work under the direction of the civil departments of the army in the spirit which is indispensable to success in a matter so critical and peculiar as the supply of an army." However,

he remarks on Assistant Commissary General Bailey's report on the transport service in the same campaign, that that officer had "over-estimated the passive resistance and the want of co-operation on the part of the officers of the military train," of which he complained. In the following campaign Deputy Commissary General Bailey, in his report on the services performed by the transport in New Zealand, acknowledges the hearty co-operation he received from all, and states how at all times they cheerfully performed the work allotted to them. The transport was composed in this case of officers and men of the Imperial forces and Colonial Militia, and the names of several officers of the line are brought to the notice of the Lieutenant-General Commanding at the conclusion of his report.

That any feeling of the kind complained of by Commissary General Turner should exist on the part of the military officers is much to be deplored, for a very important reason, viz. that, as he shows, "the Commissariat cannot afford sufficient officers for this (transport) service;" and combatant officers accustomed to duties of routine and enforcing discipline in the ranks, and by the nature of their duties being better fitted than any others in looking after transport on the line of march and in the lines, will invariably be required for the increased cadres of the transport corps on service.

To raise a large Transport Corps abroad, which will always be the case with us on account of our insular position, is a matter demanding the attention of a large staff of officers.

At the outbreak of hostilities, the Commissariat is the branch of the service which, above all others, is taxed with heavy duties and severe work. The small contracts and minutiae of routine service give way to contracts on a large scale, extensive surveys, issues, shipments and despatches of stores of all kinds, preparations of indents, correspondence, &c. The work at first is immense, and, being out of the usual routine, embarrassing, and calls for the undivided attention of every officer of the Department. This is the very time when a transport, on a scale adequate to the requirements of the force placed in the field, is to be raised, as a general rule, away from home; and it seems as if it would greatly relieve the officers of this Department to make use of officers of Cavalry, Artillery, and even Infantry, for this purpose, at this pressing juncture.

Amongst the other causes affecting the failure of the Commissariat in the Crimea was advanced the reduction of the department from motives of economy.* Is the Commissariat of such a strength now in officers to meet the requirements of a large European war, both in the supply and transport departments? In the campaign in New Zealand, for 15,017 men, the return on the 1st May 1864, shows 23 Commissariat Officers, 9 Military Store, and 5 Purveyor, besides 19 Military Train Offi-

* In the Crimean war there were 234 Commissariat Officers employed.

cers and 32 of the Transport Corps. With the small force in the Ashantee War there were no less than 27 Officers of the Control Department.

The Commissariat Officers argue that their Department, being the great contracting party of the Military Service, and having charge of the funds of the army, are better fitted to effect the extensive operations of providing the means of transport, and to account for the funds expended in them than military officers. However, during the Crimean War, where a different course was adopted in forming the Land Transport Corps, we have the testimony of General McMurdo that military officers sent to effect purchases of horses and mules were by far the most efficient. They were, as we shall show hereafter, assisted in their labours by agents and accountants provided by the War Department.

The demands of the Commissariat for the entire and independent management of all transport are as follows; and, to enable a ready comparison of the arguments adduced against the adoption of this course, the demands and objections are arranged side by side.

The foreign armies have organised an essentially military transport

The Commissary General, or other officer who may be responsible for the feeding of the troops, must have unrestricted control of all transport.

repulsing attacks made upon its convoys. This organization demands that a military officer be placed at the head of the transports.

Though the Commissariat requires a large proportion of the trans-

The Commissariat requires the largest portion of the whole transport of the army. Requiring as it does the larger portion of the transport, this Department would have most interest in its completeness and sufficiency. It requires, besides, absolute regularity and punctuality in the service, as supplies of food and forage are indispensable conditions of military success. Transport detailed for other than Commissariat purposes would be inactive for long periods together; but if placed under its control, the Commissariat would provide transport for any but Commissariat duties, when required, other times using it for its own requirements, thus causing economy of transport. One Commissariat Officer states that in the campaign in North China he estimated that he obtained an additional one-third of transport by this arrangement.

* The drivers of Regimental Transport should be, as a rule, from our own people as soldiers are prone to look down on foreigners and treat them roughly.

It is just as much in the power of the Director of Transport as of the Commissary General to direct, under the sanction of the General Commanding, the employment of all stationary transport for Commissariat or other army purposes. This can be done better as the Quarter Master General (under whose orders is the Director), being in the confidence of the General Commanding, can with greater certainty point out what portion of the stationary transport is not immediately required and can be diverted to other uses. Troops on service do not all require the same amount of transport; some—for example, those guarding a post on the line of communication—may require none at all; others, close to a dépôt of supplies, will require less than the troops further away. All that is superfluous, though forming part of the establishment, would be withheld until actually required. It is impossible to place the Regimental Transport always at the disposal of the Commissariat; part of it must remain always inactive in expectation of any sudden order to move, which on service, may come at any moment, particularly when within striking distance of an enemy.

To obviate this objection, it has been suggested to make the

Commissariat independent in the matter of transport, by having two separate bodies—one to have charge of the ammunition, regimental baggage, sick and wounded, and, in short, anything that would be brought under fire; the other to be a proper establishment for the Commissariat, and entirely independent. Having two separate trains on the line of march, separately commanded and with separate interests, would cause no end of confusion and disorder, and this suggestion does not seem at all practicable. Transport, whether as a department by itself or under the Commissariat, must be all one.

It appears that the friction caused by the want of cordial co-operation between the Military Train and Commissariat formerly arose from both not understanding the limit of the duties under which they worked. That of the Transport Officer only extends to the discipline of his detachment, the efficiency of the means of conveyance, the proper adjustment of the loads, and the protection of the stores entrusted to his charge. The

Commissariat (or other officer who makes the requisition for transport) possesses control over its movements for the performance of the service for which it is required, taking due care that it is not unnecessarily detained. The absence of the dreaded friction will depend on the efficiency of the military supervision, and principally on the Director of the Transport.

M. Baratier, *sous-intendant militaire*, in a small pamphlet, "La Vérité sur l'Unification differents Services de Transport," shows how

this very question is understood in the French service. He says: "The decrees of organization of the 29th February, 1852, and of the 11th June, 1853, make a distinction in the service of the transport train between command and employment. With regard to command, the transport train has its personal independent existence like every other corps of the army. The administration has nothing to say to the organization of these troops, the police, interior discipline, punishments, rewards, changes of *personnel*, any more than to offer advice regarding the management of the carriages or the park. Thus, under this head, the transport train is legally constituted as a really autonomous corps, depending essentially upon its own command, and having no further relation with the *intendance* than on the point of view of its interior administration; the same as all the other corps of the army." After showing the difference between the normal and the exceptional service of the corps, he adds: "The officers of the *intendance* have repressive authority over the *personnel* of the train, but only for the execution of the normal service and whilst this service lasts." Further on he concludes: "Thus, to resume, in giving, the word, to command all the acceptation which is generally attributed to it in military parlance, it is correct to say that the *intendance militaire* does not command the transport train; that she only make use of it, and that her authority is limited to the employment of the means of action possessed by that arm."

Line Officers employed on transport duties in the wars in New Zealand, Abyssinia, and Ashantee have earned a reputation for hard working and the cheerful way in which they carried out their duties, which often were very onerous. The officers for filling up the cadres of the transport in war will be principally volunteers, and such generally turn out the best workers. As long as an officer is a Transport Officer, it appears he should not be permitted to assume command over any of the troops, in any position whatever. He joins the transport, either by order or as a volunteer, and should strictly confine himself to transport duties as long as he is attached to that branch of the service. For the Commissariat to apprehend that because the officer does not belong to his own department he will not carry out his duties in a fair and impartial way, would be to ignore entirely the superior officer under whose immediate orders the Transport Officers are serving.

The amount of transport for Commissariat service is an unknown quantity; all other transport can be easily calculated. Wherever there is a Commissariat Officer, he must be alive to the chances to be profited by, and of failures to be provided against; and unless he has a Transport Officer for his shadow the opportunities for either must be lost.

Colonel McMurdo, in his memorandum of the 4th May, 1859, says:

" I am therefore of opinion—

It is one of the duties of the Transport Department not only to look after the transport with the army itself, but to procure it from all available sources, and from depots of reserve to meet this changing quantity.

" 1st. That the operations of the Land Transport Department ought not to be limited to the immediate vicinity of the army in the field, but should extend throughout the lines of communication to the base.

" 2nd. That, consequently, its organization in war should consist of two branches; viz., the regular military train, and irregular auxiliary companies, or the hired transport of the country.

" 3rd. That the functions of purchasing or hiring the means of transport requisite for the above services should be vested in the Department of Transport.

" 4th. That, as regards the means for collecting supplies into dépôt by the Commissariat, that Department should be authorized to take up and employ local transport for the purpose; and that this should be done in conjunction with the head of the Transport Department, in order that the transport so employed by the Commissariat may not be interfered with in the general levy."

It is argued by the advocates of a separate corps under the orders of the Quarter Master General (the officer who superintends all the details of the movements of troops by land and sea) that a separate Transport Department, to which should be attached the duties of purchasing and hiring the means of transport requisite for the army, the formation of dépôts, &c., means division of labour, as inducing "simplicity, which is the parent of order, rapidity, and vigour in war." That on the Transport Corps being organized, certain divisions of it would be detailed for Commissariat purposes, supplemented or reinforced from the reserve depots as necessities arise. These divisions would be used for no other purpose whatever (other portions of the transport having at the same time been detailed for the other requirements of the army); these would form the transport establishment demanded by the Commissariat, and be solely at the disposal of that Department, the Transport Officers of these being only responsible for the discipline, efficiency, and order in camp and on the line of march, otherwise conforming to the instructions they receive from the senior Commissariat Officer.

The nature of transport duties, which include the daily supervision of an immense establishment of men, animals, and materials; the maintenance of the organization of the corps through the many difficulties which are sure to arise during active service; the training, keeping at work, and replacing of thousands of animals; the keeping up of different establishments, on account of the variety of animals used for transport; the daily routine of duty, instruction, payment, rationing, inspecting, &c., of thousands of attendants, often of different nationalities and at times not of the best character; the repairs of harness; saddlery, wagons, &c.;—the supervision of these onerous duties seems to demand being placed in the hands of an officer unfettered by any other

duties whatsoever, that the establishment may be maintained in thorough working order, and its efficiency not questioned at any moment.

The question of transport also is closely connected with that of communication, and in cases of exigency, where the disposal of transport and the regulation of its movement, in certain circumstances, is affected by military considerations, it is of great consequence that it should be under the direction of a military officer.

The strongest argument brought forward by the officers of the Commissariat for claiming the unrestricted control of the transport is that, as the supplies of an army are wholly dependent on transport, the transport should be placed under the sole command of the senior Commissariat Officer. This unrestricted control of the transport seems to be rather an exaggerated demand, and it has often been remarked by officers of long service and experience that the officers of the Commissariat Department claim a certain degree of independence from the General Staff, which the nature of the military service does not appear to warrant.

The following words occur in a despatch by Commissary General Jones to the War Office, dated 6th September, 1865 :—

“ And lastly, I consider that the Commissary General ought to have the power of conveying to the army, in general orders (unquestioned by the Adjutant General and Quarter Master General), his directions connected with finance, supplies, and transport, in precisely the same way as the Adjutant General does for the *personnel*, and the Quarter Master General for the *materiel*, of the army; taking his instruction for such duties direct from the General Commanding, in the same way as those officers do in their respective departments.”

It appears that every sacrifice, in fact, should be made, and every means given, to secure the success of the Commissariat Service; as if every General Commanding would not be anxious to obtain this, however subordinate to other serious military considerations.

The General Officer, being the person most interested and responsible for the success of the operations entrusted to him, will be the first to authorize all unemployed transport to be utilized to forward supplies and other necessaries for his troops. As examples of this, in the last two expeditions we have been engaged in, we see Sir Robert Napier in Abyssinia reducing to a minimum the baggage and camp equipage of his officers and men to increase his means of transport for supplies; and in the expedition to Ashantee, Sir Garnet Wolseley employing most of the troops he had on the Prah as carriers, to supplement his insufficient means of carriage.

After all the arguments adduced in favour of the transport and supplies being both placed under charge of the Commissariat, after the Committee had issued their report on the administration of the Trans-

port and Supply Departments of the army, we find in the only two expeditions we have sent out since, to Abyssinia and to the Gold Coast, the transport at the end of the campaign under the direction of a military officer, and not of the Commissariat.

This is strong practical evidence that some of our military authorities do not endorse the claims set forth by the officers of the Commissariat Department, and are still in favour of the Land Transport Service being a separate department, under the control of the Quarter Master General.

When a large force was in Canada, after the *Trent* affair, it was urged in favour of placing the Transport under the Commissariat, "that no other department could watch and prepare for casualties or work so indefatigably as the most interested (and responsible); that to the Military Train Commissariat supplies might be a very secondary consideration, to the Commissariat they would be the first; and to the Army, subsistence is of too vital importance to be entrusted to any department but that which, being solely responsible for it, would make it its chief duty."

The transport of supplies, in which the Commissariat claim to be the most interested, is but one branch of the entire transport of the army. The Quarter Master General is the officer who, above all others, assists a General Officer in regulating all the movements of the army. As the army cannot move without transport, he naturally becomes (always after the General Commanding, who is the responsible person for handling and subsisting the troops) *the officer most interested in the sufficiency and efficiency of the entire transport*. He must be thoroughly cognizant at all times of the state and distribution of the transport, and, as far as strategical movements go, the transport must be under his direction. He has no interest in the success of any particular department of the service; to him the success of the whole is of paramount consideration; and, notwithstanding the arguments adduced by the officers of the Commissariat Department, it appears that of the two he is the officer best fitted to provide for the economical use and employment of the transport of the army.

It is not intended to increase the already immense work that falls to the lot of the Quarter Master General on service by placing the transport under his charge. A Director of Military Transport relieves him of all the working of the corps, keeps him correctly informed of the daily employment of its various parts, and receives his instructions regarding the requirements of the army in all matters of transport.

It appears to be generally admitted, first, that the portion of the transport moving with an army requires a military organization; second, that the entire transport, which comprises—

1. Regimental transport, in charge of Commanding officers.

2. Field Hospital and Ambulances, in charge of the Medical Officers;

3. Supplies, in charge of the Commissariat—should be constituted as one body, under one direction, and should extend throughout the lines of communication to the base.

The Infantry and Artillery ammunition reserves on a battle-field participate, though in a limited way, in the action of Artillery, therefore a close intimacy between the Artillery and the ammunition reserve will be of advantage. This can be obtained by organizing its transport from the Artillery itself.

The Army Transport Corps should supply the various branches of the army with drivers, animals, and carriages, and should provide besides the Officers and Non-Commissioned Officers for the Auxiliary Transport, so that one system under one direction may be carried out throughout the entire transport of the Army.

Some officers are of opinion that any man is good enough for the transport, and that men whose diminutive stature unfit them for the ranks, can be utilized as drivers; but a Transport Corps man requires to be robust and able to lift and adjust heavy loads, and tend his animal at the end of a long fatiguing journey. In the train columns, moving in rear of the army, the service is very severe, and the Germans found in the last war that the wear and tear of the transport in men and animals was very considerable. A certain *physique* must therefore be looked for in enlisting men for the service, which is often not to be found in men of very low stature.

One of the most striking alterations introduced in the organization of the German armies in their late wars was the entire separation of the fighting force from the troops detailed to guard the line of communication—a most important improvement, when we bear in mind how the numerical strength of an army used in former times to be continually reduced during an advance, by having to leave more or less strong detachments at various important places in the rear, where dépôts, magazines, hospitals, &c., were established on the road by which the army communicated with its base.

Great attention in future will be paid to the line of communication, and the troops to guard this line will consist of a body of the three arms complete in itself, under the command of a superior officer, who will be charged with the protection of the line, the administration of the country occupied, the supervision of the various services to which the army must look for all it requires during a campaign in the way of reinforcements of men and horses, provisions, ammunition, and other military stores, and the removal of the sick and wounded.

These various services embrace, amongst others, transport of all kinds, including railways, for the supply of the *matériel*, provisions, and

stores, removal of sick and wounded, reinforcements, the construction and repairs of telegraph lines, and postal arrangements. This transport will form the second line of transport,* and will be charged to convey all that is required for the army from the base to the most advanced magazines. From this point the first line of transport, divided into departmental and regimental, will divide amongst themselves the remainder of the duties ; the first working up to the divisional dépôts, and the last from these points up to the regiments and corps at the front.

Thus the impediments of an army will be immensely reduced, nothing but what is actually necessary being with the army in front. The departmental work will be carried out in rear, under the direction of the officer in charge of the line of communication, who will generally remain one day's march behind the head-quarters of the army, and who will be assisted by Staff Officers, to look after the troops detached for the protection of the line of communication ; by Police Officers with a body of military police, to inquire into the disposition of the inhabitants and prevent any disturbance along the line ; by civil functionaries, to administer the occupied provinces ; by Commissariat Officers, to look after supplies and stores ; by Surgeons, for the supervision of hospitals and the removal of the sick and wounded ; by a Railway Director, to manage the railway lines and effect all necessary repairs ; by Transport Officer, to arrange for all carriage in excess of that furnished by a railways ; and finally, by Postal and Telegraph Officers, to work the details of those departments.

* The second line of transport, on account of the variety of the services it has to attend to, the continual stream of supplies and reinforcements moving up to the front, &c., requires to be formed on a large scale, and is by far the largest portion of the whole transport of an army.

**HOME AND INDIAN TRANSPORT,
AND STEPS TAKEN TO PROVIDE A TRANSPORT CORPS IN SOME OF OUR
FORMER WARS.**

The available transport at home consists of twelve troops of the Army Service Corps, with wagons.

For want of sufficient transport during the autumn manœuvres, Horse Artillery have been employed in horsing wagons, and formed into an Auxiliary Transport.

Troop horses have also been used to draw the wagons of Cavalry Regiments, but this plan did not meet with the approval of many Cavalry Officers of experience, the animals being generally unsuited for draught.

These are only makeshifts during peace manœuvres, in time of war not to be resorted to, as it is necessary then to keep every battalion and squadron at its proper established strength.

To make up for our deficient transport, a large number of vehicles, of all shapes and descriptions, were hurriedly hired during the autumn manœuvres of 1871 and 1872. No attempt, therefore, could be made to introduce any organization into this kind of transport, and of this our officers and the nation at large did not feel very proud.

In the autumn manœuvres of the last few years officers and men from Line Regiments have also been sent to Woolwich and Aldershot to be trained for transport duties, and in 1872 the regimental transport system was thoroughly tried.

In the following manœuvres was tried the system of providing transport for only one-half of the force, and transferring it to each half, from day to day, as it became necessary. It is plain that this plan, evidently devised for purposes of economy, could afford little instruction in the matter of transport.

Our Transport Corps at home is no school for the duties to be performed by that branch of the service in war. The roads are good; the description of wagons used is very heavy; built with the principal object of their lasting for a number of years, these are totally unfit to be used on the bad roads over which our troops have generally to march, and are unsuited for the small horses we can purchase abroad. Our expeditions are mostly carried out in India or the adjoining countries, and in these our Army Service Corps is not called upon to serve. The transport duties at home (with the exception of the season for manœuvres) are very light, and the Transport Officers have no

opportunity of acquiring any instruction in the extensive requirements of their branch of the service in actual war.

The twelve transport companies of the Army Service Corps are distributed for duty between the stations of Woolwich, Chatham, Portsmouth, the Curragh, and Aldershot; the strength of each is 133 officers, non-commissioned officers, rank and file, with 91 horses. The twelve companies, therefore, represent a total strength of 1596 officers, non-commissioned officers, and rank and file, and 1092 horses.

The war establishment and organization of the transport companies Army Service Corps have undergone a marked change by the issue of the table which accompanied the Army Circulars of the 1st December 1877.

To the existing establishment of each company will be added for service 13 of all ranks, with 6 riding horses, which will bring up its cadre to 146 of all ranks, with 18 riding and 79 draught horses. These numbers, however, do not in the least represent the strength of the companies on service, as the drivers and draught horses are to be added to the cadres in whatever number it may be deemed necessary, from reserve or local means; so much so, that for the 8 companies required for any Army Corps in the field, the totals are 1795 of all ranks, with 144 riding and 2746 draught horses, demanding an increase over the peace establishment of 731 of all ranks, with 48 riding and 2114 draught horses. This will be better explained by the following table:—

Officers and Men.	Riding Horses.	Draught Horses.	
1064	96	622	Strength of 8 companies at the present establishment.
104	48	...	Required to bring the cadres of 8 companies to war establishment.
627	...	2114	Required to complete the numbers necessary for an Army Corps in the field.
1795	144	2746	Total strength of 8 companies with an Army Corps in the field.

The strength of the present establishment, already given as 1596 officers and men, with 1092 horses, would be raised in war time to 1752 officers and men, with 1164 horses; these figures would then only represent the cadres of the 12 companies, the additional drivers and horses will greatly depend on circumstances.

The correct principle in the matter of transport is to give such an organization to the nucleus which, for just reasons of economy, is tained at the lowest possible figure in peace time, as will enable assume its proper proportions rapidly on the outbreak of a war. division of the various companies each into four sections for part duties has been a great step in advance in the organization of the transport.

The sections are to be used detached, under the command officer; but the strength of each one in drivers and horses will according as it is attached to a different part of the Army Corps. an Army Corps eight companies are required, four for the 1st and for the 2nd line. The organization tables show at a glance what each section is to be detailed for, and the number of men, horses, carriages required, not only to complete it to its war establishment to enable it to carry out efficiently the duties it will have to perform. An examination of these tables will convey the best idea of the working of the new system, and they are on that account embodied in the studies.

With some sections of the Army Service Corps Transport will be incorporated officers and non-commissioned officers of the medical department and Army Hospital Corps, and a certain number of bearers to assist the wounded and remove them from the field of battle to field hospitals. These form the bearer companies, to each of which will be attached 10 ambulance wagons and 23 spring carts, which last will be taken with drivers and horses from local sources, when available. For mountain warfare these bearer companies will approach very closely to the *compagnies légères* of the French service, each company having 40 muleteers and 100 mules, cacolets and litters replacing the ambulance wagons and spring carts. Of the 100 mules, only 76 are for the conveyance of the sick and wounded; the remaining 24 are for equipment, water bags, appliances, &c. (See Tables annexed.)

In the Crimean War it was estimated that over 20,000 transport animals were required for our army of 30,000 men to take the field with efficiency: this will show what expansion of the present corps would be necessary on service. Of this number, of course, a large portion would belong to the second line of transport, again, operating in a country traversed by railroads, the numbers of animals would bear a considerable reduction; but until our soldiers are made to carry a certain amount of provisions on service, can be made to thrive on the preserved provisions consumed by the soldiers of continental armies and can dispense with tents, our transport will remain out of all proportion to the number of the troops in the field.

The regulations with our subjects and neighbouring rulers in India are such as to demand means for moving troops at the shortest notice; for this purpose a certain quantity of transport is always kept up in the Indian army, and is known as the moveable column carriage.

- (c) The regiments of Carriages on the staff of the Transport Detachment attached to the Brigade, &c.,
- * By the Commissariat and Transport Tables of an Army-Corps, each Brigade and Division has a further establishment of Officers who would be available for transport purposes on an emergency.
- (d) In case of the establishment of Regimental Artilleries being unequal to perform the necessary regiments of Cavalry, &c., the work will be performed as in (c).

ARMY SERVICE CORPS.

TRANSPORT COMPANY.

The Company of Transport is calculated and organized on a footing that will, by the addition of certain details on taking the field (enumerated below in block type), permit of its being used with sections detached. The War Establishment of Drivers and Horses will vary with the portion of an Army-Corps to which the Sections are attached.

I.

Company.—When a Company is attached to a Division it will be thus divided—

- (a) Hd.-Qrs. and No. 1 Section will be supply the Departmental Transport of the 1st Line of Divisional Details.
- (b) 2nd Section to the Bearer Company, when so attached, the Sergeant is not promoted, and the Corporal and Trumpeter are not added to the cadre, but a riding horse is added, and given to a N.C. Officer.
- (c) 3rd and 4th Sections to 1st and 2nd Infantry Brigades respectively.

II. and III. Companies.—To 1st Line of 2nd and 3rd Divisions.

IV. Company.—(a) Head Quarters and 1st and 3rd Sections will supply the Departmental Transport for 1st Line

of Corps Details, including 1 Bearer Company, and No 2 Section of this Company will be Reserve.

(b) 4th Section to Cavalry Brigade, including 1 Bearer Company.

Four more Companies will be required to supply the Departmental Transport of the 2nd Line of Divisions, and

Note.—(a) The Drivers and Draught Horses will be augmented to what ever number may be necessary from Reserves or local means.

(b) The repairs to Harness, and Shoeing of Horses, of Regimental Transport, will be performed by the Regimental Artificer.

(c) The repairs of Carriages of all Transport, and Shoeing of Staff Officers' Horses, will be performed by the Artificers of the Transport Detachment attached to the Brigade, &c.

(d) In case of the establishment of Regimental Artificers being unequal to perform the necessary repairs to Saddlery, &c, the work will be performed as in (c).

* By the Commissariat and Transport Tables of an Army-Corps, each Brigade and Division has a further establishment of Officers who would be available for transport purposes on an emergency.

(232)

It is calculated that it has the effect, by giving the troops more mobility, of reducing the number required for the effective occupation of that country.

Of the Indian Transport men, Sir Hugh Rose, in his memorandum dated Poona, January 9th, 1860, says: "The camel, elephant, bullock drivers, in short the men of the 'Train,' from being all undisciplined and unorganized, compromise the safety, credit, and discipline of the army by the commission of every description of disorder and outrage, for which in India they are proverbial.

" They render hostile to the troops the inhabitants of the country by ill-using and plundering them, thereby endangering our communications, supplies, and means of information.

" They give the worst example to the soldiers."

Lieutenant Collen, Royal Artillery, in a lecture on the Military Transport and Supply of India, gives some details of the strength of the transport kept up in that country. and from him we learn what amount of it is required to move the different arms of the service.

According to him, the present scale of moveable columns was fixed in 1861, and for Bengal may be taken as constituting a force of—

- 9 Batteries, or 54 guns, with the first line of wagons,
- 6 Squadrons British Cavalry,
- 9 Squadrons Native do.,
- 9 Battalions British Infantry,
- 12 Battalions Native do.

" The largest column in Bengal consists of—

- 1 Battery Artillery,
- 1 Regiment British Infantry,
- $1\frac{1}{2}$ Regiment Native do.,
- 1 Regiment Native Cavalry.

" The smallest of all arms of—

- $\frac{1}{2}$ Battery Artillery,
- $\frac{1}{2}$ Battalion British Infantry,
- $\frac{1}{2}$ Battalion Native do.,
- 1 Squadron Native Cavalry.

" In Bengal there are twenty-three moveable columns; and if we estimate those in Madras and Bombay together at one-third of the Bengal strength, we would have approximately a force of—

- 12 Batteries,
- 8 Squadrons British Cavalry,
- 12 Squadrons Native do.,
- 12 Battalions British Infantry,
- 16 Battalions Native do.,

or, in other words transport is provided for a force equal to an Army Corps of 72 guns, 28 Battalions of Infantry, and 20 Squadrons of Cavalry.

" In the Bengal Presidency the authorized Transport Establishment is, speaking approximately, 1000 elephants, 6600 camels, 350 pack bullocks, 530 draught bullocks and 1500 mules.

" It will, however, give an idea of the transport necessary in India if I state that a Regiment of British Infantry equipped on this moveable column scale requires about 41 elephants, and 280 camels; a Battery of Artillery, 10 elephants and 74 camels; a Squadron of British Cavalry, 7 or 8 elephants and 66 camels; a Regiment of Native Infantry, 112 camels; and a Squadron of Native Cavalry, 9 camels."

Seven days' supply of food for the numbers composing each moveable column is always kept in store by the Commissariat; the amount of rations conveyed with troops is seven days for Europeans, two days for Natives, and two for horses.

These moveable columns are distributed all over the extensive territories of British India. The concentration of the transport kept up for their, use, to be applied to any particular purpose, is impossible, as long as the necessity for keeping these columns ready to move at the shortest notice exists.

The Native Cavalry require less transport than any other body in India, as each two troopers are bound to keep up at all times a pony for the transport of their tent, baggage, and personal property.

Each regiment of the Punjab Frontier Force maintains a permanent cattle establishment of fifty-five camels and forty mules for the transport of its regimental baggage, and moves annually into camp to practice Light Infantry movements on the hillside. The regulations point out that "the design of the order is not only to accustom the men to drill on the hillside and over rough and broken ground, but also to give Commanding Officers the opportunity of organizing and controlling the baggage, camp equipage, public carriage, and hospital establishments of their regiments."

We have shown what the nucleus is of the transport kept up both in India and at home; from the expansion of either of these would, no doubt, be formed a Transport Corps for our army in the East or elsewhere. It would be too expensive to keep up a transport on a large scale in time of peace, but what is kept up should be so organized as to be able to be rapidly augmented without in any way injuring its efficiency.

Many of our wars and expeditions have been as near failing as possible owing to insufficient or badly-organized transport.

The confusion and disorder in the early part of the Abyssinian Expedition will be dwelt upon hereafter, when mules were landed without even a halter to picket them with. In the Looshai Expedition, in the words of the Officer Commanding the Cachar Coolie Corps, "a state of uncertainty and confusion lasted until the force had commenced its retreat." As late as the Ashantee Expedition, the 2nd West India Regiment and Native levies, about the only troops on the Prah, were turned into carriers, and a portion of the British troops were left on board ship, owing to insufficient available carriage.

In several of our expeditions in India and in the one to Abyssinia the blame of the want of organization in the Transport Corps could not attach to the military officers, for the civil authorities, unacquainted by want of experience of how entirely final success in war depends on the transport, were deaf to the warnings of the military officers, and even opposed the measures they suggested.

In the Sittana Expedition, Sir H. Rose warned the Indian Government that considerable preparations were necessary for the due equipment of a force of 5000 men intended to enter a hostile, difficult, and unknown country, as regards supplies, transport, ammunition, &c., and the time to prepare the expedition was insufficient.

Sir J. Adye, in his account of this war, remarks: "The Lahore Government, indeed, authorized the hire of camels and pack mules in considerable numbers, as best adapted for the contingency; but the mere hasty collection of animals never can constitute an effective transport."

The result of this was that "the obstructions in the road, the great amount and inferior nature of the transport, and the incompetence of the drivers, caused serious delay."

When the Abyssinian Expedition was determined on, Sir Robert Napier submitted to the Bombay Government the details for the organization of a Transport Corps. These did not meet with approval, and his scheme had to give way, and was replaced by an organization sanctioned by the civil authorities. However, the marked contrast between the efficiency of the Lahore Mule Train on its arrival in Africa, and the confusion and disorder, at first, of the rest of the Transport Corps, shows how correct Sir R. Napier's views were from the very beginning.

The Lahore Mule Train was raised by Captain A. G. Ross, Bengal Staff Carps, at Lahore, in the Punjab, in September, 1867, for service in Abyssinia. Though the drivers were not enlisted men, but simply hired followers, certain military habits and customs were introduced into the Train from its first formation. These, enforced during a long march to Kurrachee, where the train was embarked, rendered it a

disciplined body, and made it efficient from the beginning to the end of the campaign.*

Again : The organization submitted by Lord Napier for the Transport Corps for the Looshai Expedition was not approved by the Government of India, though here again the soundness of his views was shown by subsequent events.

All cases of extraordinary expenditure are referred to the Civil administrators. These, considering them as likely to effect the prosperity of the country in their charge, often deprive the Generals of the means which in war are his rights; for a General has as great a right to be supplied with an efficient and sufficient transport as with troops to fight with, so much of the ultimate success depending upon it. Were he not an officer of ability and experience, it is hardly to be supposed he would be placed in a responsible position. This gives weight to his opinions, which should receive consideration from people who have not experienced any of the many difficulties that encompass a war or distant expedition.

All wars are expensive undertakings, and much more so with us, who are often compelled to wage them at a great distance from home, and against savage, poor nations, from whom even a fraction of the expenses of the war cannot be recovered.

To make war on economical principles is quite right, but to cramp a leader in one of the principal means of conducting it to a speedy and successful termination, is to increase the already numerous difficulties which beset the General of an army, and which are sure to endanger its ultimate success.

The strain of mind on a General during a campaign is very considerable; and it is not saying too much that the anxiety engendered by the want of proper means for conducting the war may often cause the abandonment of some brilliant conception, and give a character of mediocrity to the whole operations.

The pressing of animals, carts, &c., for a war or expedition will undoubtedly affect the agricultural prospects of a country. If the war is carried out in an enemy's country, the consideration of this result may possibly, amongst many others, bring the enemy to terms; but where the carriage is pressed in one's own country, owing to the impossibility of obtaining it in the invaded territory, the future consequence of such pressing must be seriously considered. Purchasing will be preferable, though the above difficulty is by no means solved by adopting this plan. In this case, however, the owners, part with their property willingly and

* The efficiency of the Chinese Coolie Corps in the Expedition to North China of 1860 was due to the corps being efficiently officered, well organized, and to the coolies having become well familiarized with their work before the corps actually took the field.

receive compensation for it, which deprives them of any reason for discontent in future. The carriage is your own, and you can dispose of it as you like. The same applies to drivers; if enlisted of their own free will instead of pressed, they will work better, for a pressed man is an unwilling man and works badly. With enlisted men you can also introduce any system of discipline you may think necessary to adopt.

Before enquiring into the transport arrangements that have been made in our past wars and expeditions, it will be well to examine the system pursued in India, the country in which many of our wars have taken place, and from which several important expeditions have been fitted out for operations many miles away from its shores.

The Commissariat is the great Supply Department of India; it is the only Department authorized to incur expenditure for the purchase of stores and materials, procuring all those suitable for the service that can be purchased in that country. It obtains, either by purchase or by contract, everything required by the army, and provides all departments with such stores as they may need.

The Commissariat keeps no stores besides those required for rationing the troops, feeding the horses, and supplying the hospitals.

The officers are military officers who rise in the different grades of the Department, but do not relinquish their military rank, and attain promotion to the various ranks like the rest of the officers of the Indian Army.

The Commissariat may be said to be the head of the Transport Department in India, for it has charge of the small establishment of hired cattle maintained for transport purposes in time of peace. These small establishments require to be very largely increased whenever the necessities of the State call large bodies of troops into the field. It is then that the advantage of maintaining a small quantity of transport in time of peace becomes apparent, for it facilitates the extension of the transport, the contractors coming readily forward with further supplies. All the departments, then, look to the Commissary General to enter into contracts for purchasing or hiring the additional cattle required; but the Commander-in-Chief has virtually, through the Officers commanding Divisions and others, control over the cattle and drivers told off for the various services of the army, the Commissariat only acting as agents employed to contract for transport.

The Indian Commissariat possess great influence, and in its exertions to obtain carriage receives great assistance from the Civil and Political Officers of the country, who bring their authority to bear on the people. The system of employing this Department to obtain carriage and supplies originated from motives of economy. The contractors for carriage are also men of influence and wealth, and through them the Commissariat is able to obtain the large amount of supplies required for

troops on service. On the point of supplies, it should be observed that the followers, both public and private, often amount to from three to five times the number of the fighting men, and in some cases require to be fed, as well as the combatants.

In Sir Charles Napier's operations in Cutchee, a most wild and difficult country, though the fighting men did not amount to more than 5000 men, "no less than 20,000 persons and their innumerable animals were to be provided for and handled amidst those barren rocks."

(Sir C. Napier's *Administration of Scinde.*)

Most of the transport for the army in India is done by pack animals. This kind of transport, which was very suitable in the early years of British conquest, owing to the want of good roads and means of communication, is maintained up to the present time; though a number of excellent roads for wheel carriages now intersect the whole country, and many even of the secondary roads are well fitted for carts of a light description in the fine dry months of the year, the mouths in which military operations and movements of troops generally take place.

The substitution of wheel carriage for the present pack animals would be an immense increase in the power of the Indian Transport, though there is no doubt that such animals as camels and elephants are well suited to carry the large and cumbersome tents used by the European troops.

The Indian Transport is purely a Civil Transport, with no attempt at organization or sub-division into regular fractions, and on the line of march the various parts move independently, without following each other in any particular order; thus the Indian armies are followed by a confused mass of baggage animals and followers extending for a long way in the rear of the troops; this seriously hampers the freedom of their movements, and has made the progress of our armies proverbially slow.

The Indian Commissariat, with all its good points, has not as yet exercised that supervision of the transport of the army on the line of march so very essential in war. It has provided the animals required, it has arranged for there being fed (a difficult question, no doubt), it has replaced the animals lost or incapacitated; but there its work, so far as the transport is concerned, has ceased. It has not introduced any organization by which its movements on service might be rendered orderly; it has neither divided the duties of its officers into transport and supply--perhaps for the reason that its strength in officers was not sufficient to allow them to attend only to one section of their duties.

That the Indian Transport is capable of becoming an organized and orderly body, the result of the organization introduced in the Lahore Mule Train in Abyssinia is a very striking proof. Other

examples are not wanting, for, as early as 1844—45, Sir Charles Napier in Scinde gave a military organization to his transport; this was again revived when a Bombay column, under Sir D. Dundas (better known later as Lord Melville), was despatched to co-operate with the troops besieging Mooltan. It may be urged that it was the duty of the military authorities to introduce the required organization into the transport, but this could only be introduced gradually and by degrees in time of peace, in the small establishments kept up by the Commissariat, and not suddenly on service, in the large masses of which generally our transport was constituted. The required organization need not be carried too far, but should provide against desertions and loss of animals, ensure a cheerful obedience of orders and the performance of their calling by the drivers, their orderly movements on the line of march, and the abstention from committing disorder and outrages, or ill-using and oppressing the inhabitants of the country the army marches through.

Sir Charles Napier when Governor of Scinde introduced a military organization of the transport animals, to guard against the baggage being any longer a confused host of men and animals, and principally to provide against desertions, disorder, and the breaking down of the finest combinations which invariably occurred when the baggage animals were hired and the drivers undisciplined.

He divided the camels into divisions of 600 each, the animals being the property of Government, the drivers enlisted men, disciplined, armed, and drilled as soldiers, and commanded by regular officers. The men were clothed in uniform, and each division had a directing animal on which was carried a flag by day and a lantern by night; the flag, the light, the trappings of the camels, and the uniform of the drivers of each division, all corresponded. The animals were classed as strong and weak, and bore round their neck tables to show the maximum load of their class. One driver was given to each camel; but with each three camels one led the animals, the other two formed the escort. The camel corps was under the command of a superior officer; and in case of attack, instead of the baggage animals pressing in a confused mass on the troops for protection, they formed rings or squares, the animals kneeling down with their heads inwards, and from behind them the drivers drove off the assailants by the fire of their carbines.

This organization, by which Sir Charles obtained increased mobility for his army, was objected to on the score of expense, and was afterwards discontinued. The baggage corps providing its own escort had several important advantages; it maintained the effectives of each corps at their proper strength. No regular troops were fatigued by having to march in the dust at the slow pace of the baggage animals. The drivers, not being all required to take the animals to graze, obtained rest alternately; being armed and led, did not desert on the first appearance of danger, and the General was relieved of any apprehension regarding the safety of his baggage train.

In Scinde, Sir C. Napier was operating in a country teeming with armed robbers and most daring freebooters.

In India, the Commissariat, as the only department accustomed to deal with contractors, is undoubtedly the proper department to entrust with the raising of the transport; it would be absurd to allow other departments to go to the open markets and bid for the transport animals they each require in opposition to one another. Whether it is the best department to look after it on service is very much to be doubted, for the one great reason that it has not sufficient officers to detail for the necessary superintendence of it.

A review of the Indian Transport arrangements, where the animals and followers are out of all proportion to the force sent into the field, would not answer our purpose, for we could not deduce any useful information for general purposes.

Sir J. Adye, in his remarks on transport in India, says: "The transport required for food, ammunition, medical stores, clothing, and the hundred details which go to meet the almost artificial wants of modern armies, render rapid locomotion nearly impossible, and our Indian experience has hitherto been very adverse to light equipment.* For a century past, indeed, our troops have wandered slowly and wearily over the interminable plains, followed by long lines of elephants, camels, bullocks, and carts, transporting huge tents, together with tables, chairs, bedsteads, carpets, crockery, and many other unwieldy and unnecessary items of officers' and soldiers' equipment; and to these impediments must be added the hordes of native followers, who, far outnumbering the fighting men, have been and still are the invariable appendage of our Indian Army." The large amount of transport which accompanies our army in India is in part indispensable to carry the large and heavy tents so much required in that very hot country to maintain the European soldier in good health. Many animals are required to carry his kit, and by the employment of native servants he is saved many duties which, by exposing him to the burning rays of an Indian sun, would soon undermine his constitution.

Too many servants make our soldiers in India lazy and helpless; a little more employment would be of advantage to their general health. After the arrival of the 11th Hussars in India in 1866, their Colonel discontinued the employment of syces (native grooms) to look after the horses; and the very healthy state of the regiment during nearly eleven years of service in that country was a positive proof that the extra work entailed on the troopers had not told in the least on their constitution.

* In 1853-54, Colonel Mackeson, Commissioner of Peshawur, led an expedition to punish the Hasanzai tribes for the murder of Messrs. Carne and Tapp. The expedition was to operate in a difficult and mountainous country; but, speaking of the regular troops held in support, Lieutenant-Colonel Paget, in his record of expeditions, says: "They were in a confined, narrow valley, encumbered with impediments, double-poled tents, double sets of tents, doolies, palkies, and hundreds of camels; in short, the column was equipped as if for an ordinary march, and not for mountain warfare."

According to the Indian regulations, carriage at the rate of 40 lbs. is provided for each non-commissioned officer and soldier proceeding on service, and ten per cent. of the private followers are allowed to accompany the troops. The sick carriage for European troops is calculated at five per cent. of the strength, and that for native soldiers at one per cent.

The first important military operation in which our army was engaged after the battle of Waterloo was undoubtedly the invasion of Afghanistan, and the subsequent operations under Generals Pollock and Nott. In these operations, the result, from the civil nature and want of organization of the transport, was anything but satisfactory. A paragraph in one of Sir W. Nott's letters describes the state of things on the first starting of the expedition :—

"The total strength, 10,000 fighting men, not including camel drivers, 40,000 camp followers, and 30,000 camels. The movements and establishments of the Persians under Xerxes and Darius Codomanus were here repeated upon at least the same scale."

Sir Charles Napier remarked of this expedition that "the convoys were like Falstaff's bill for sack, the troops like the item for bread."

Major Hough, in his account of the war, remarks : "The fact is, that most of the officers had too many camels, too large tents, and too much baggage; though Sir H. Fane had issued an order to caution all against taking large tents or establishments."

In 1869 the army marched from the Indus to Candahar without meeting any opposition on the way; still it suffered severe privations and an immense loss in stores and baggage animals. It is related that between Ferozepore and Candahar the loss of animals amounted to no less than 20,000. All through the operations in Afghanistan the large numbers of transport animals we had, most of which were ill-suited to the climate and too slow of movement, were a serious hindrance to our army. The principal causes which affected the health of the baggage camels were overloading, want of sufficient rest, insufficient grazing for the large quantity of animals employed, and, after a long march, too short a time available for the animal, who is a slow eater, to graze sufficiently.

The following paragraph from Major Hough's account of the war explains partly to what was due the immense loss in baggage animals during this expedition :—

"We were obliged to carry our supplies, not getting a day's supply on the road. If we had entered the Pass (Bolan) with fresh cattle, or animals not jaded after a march of 833 miles from Ferozepore, 1038 from Kurnal—indeed, some of the cattle had marched nearly 1200 miles—the animals would not have been so knocked up; but they were

worn out by a long march, bad water, and want of food, and therefore our loss was very severe, and those remaining had strength only equal to the carriage of half-loads. As the Rewarce camels (of which class they chiefly were) are not fed on grain, it will be readily imagined what numbers would die on a march where their food was to be derived from a barren country."

To all this should be added a certain amount of dishonesty on the part of the owners of the camels, who exaggerated the number carried off by plunderers to obtain compensation for more than they had actually lost, and to whose disobedience, in taking the camels to graze beyond limits and in forbidden directions; many of the losses were due.

The loss of Government stores and supplies was also very considerable. In one case Hough narrates how a convoy consisting of 2000 camels with 8000 maunds of grain, left Shikarpoor, and on arrival at Candahar it was found that little more than one-fifth of the grain only had reached that place.

In 1833 the Royal Wagon Train was disbanded, and in the British Crimea. Army at home there was no vestige of a Transport Corps left. When the war with Russia broke out, in 1854, and a British army was sent to Bulgaria, there was no transport for it. Horses and mules were purchased at Constantinople, Malta, Trieste, Barceloua, and in Turkey, and the Commissariat began organizing a transport. No provision either was made in England for the equipment of a Transport Corps at the commencement of the war; pack saddles, bridles, picketing materials, clothing, &c, had likewise to be purchased at Constantinople. On the expedition proceeding to the Crimea, sea transport not being available for the animals already collected, only seventy-five mules and a few Maltese carts were landed in that country with the army. A large convoy of Arabas, which luckily fell into the hands of the British soon after their landing, and the above, was all the land transport the British army had to rely upon until it established a base at Balaclava.

During the severe winter of 1854-55, when the Commissariat arrangements for transport were found to have failed, a Land Transport Corps was raised by Royal Warrant of the 24th January, 1855.

This corps was a regularly organized body, principally officered by well-conducted non-commissioned officers from the regiments in the Crimea, and it was gradually augmented during the progress of the campaign.

At first our consuls abroad were appointed as agents for the purchase of the large amount of animals required, and they received a certain percentage, fixed by the Secretary of State for War, as a remuneration for themselves and for the payment of sub-agents and other expenses incurred previous to the delivery of the animals.

These consuls, possessing as they did a fair knowledge of the resources of the country, would have been very useful, were it not that it was found incompatible for them to absent themselves too much from their posts. Special agents, principally officers of the army, were therefore appointed for Syria, Bulgaria, Spain, and Piedmont, on fixed salaries, the salaries of sub-agents and other expenses being defrayed by Government.

With the special agents were accountants appointed by the Secretary of State for War, who, on their requisitions, paid for the purchases effected, checked accounts and pay lists, and corresponded with chief accountant, from whom they received instructions regarding the keeping of accounts and the money transactions of the agency. The agent arranged for the pay and subsistence of the convoys sent to the reserve depôts, and reported all transactions to the head of the Transport Department in the field.

Money was obtained by a warrant on the treasury chest signed by the commander of the forces, the head of the transport, and the chief accountant. On this warrant, the consuls, or special agents' accountants, negotiated a bill upon the treasury chest; or bills were drawn upon Her Majesty's Treasury direct where this was not feasible.

Animals were purchased at Diarbekir, Trebizond, Bagdad, Erzeroum, Samsoun, Bucharest, the Dardanelles, Antioch, Aleppo, Damascus, in Syria, Bulgaria, Spain, and Piedmont.

Two depôts were formed for transport animals; one in the Dardanelles, where all animals from Spain, Piedmont, Sicily, and the Archipelago were collected; the other at Sinope, for the reception of all animals purchased in Asia Minor.

By the beginning of 1856, 28,000 horses, mules, and camels had been obtained for the prosecution of the war in the spring.

The Director of the Transport reported that it was found that the most efficient agents for purchase and hire of transport were officers of the army. Some of these were Colonel Moberly, Royal Artillery, and Colonel Kinloch, in Spain; Captain MacDougal, Royal Artillery, in Piedmont; Captain Joues and Dr. Hyslop, at Bagdad.

The Land Transport Corps, worked entirely in the Crimea, but at Scutari and other places in Turkey where we had troops the Commissariat continued to have charge of the transport.

The Land Transport Corps, notwithstanding the hurried way in which it was organized and the extremely raw material of which it was composed worked exceedingly well; the fact, however, remains that its efficiency and working were not thoroughly tested, as the British Army in the Crimea was stationary, and the duties of the corps consist-

ed in bringing up stores, supplies, and war *materiel* from Balaclava to the various divisions and depôts at the front.

At the conclusion of the war the strength of the corps was much reduced, and it was turned into the Military Train. Since then a portion of this corps has been engaged during the Indian Mutiny (where it acted as Light Cavalry), in China, New Zealand, and Canada. On the formation of the Control Department it lost much of its military character, and was turned into the transport companies of the Army Service Corps.

Passing over the Persian War and Indian Mutiny, where the transport was organized, according to the Indian scale of requirements, we come next to the war in the north of China of 1860.

The Land Transport for the force sent to China had to be entirely formed ; it was placed under the control of China. the Commissariat, and officers were despatched to India, Singapore, Japan, Manilla, and the Chinese treaty ports to make the necessary purchases of animals.

A horse and bullock establishment, composed of about 2500 animals and 2000 drivers, was organized. It was divided into three brigades, officered and superintended by the Battalion of Military Train sent with the expeditionary force. The drivers came from India, China, and Manilla, each man having the care of three animals. A number of wagons and Maltese carts were supplied from Woolwich, but were found to be of inferior quality.

Besides the above establishment, a corps of Chinese carriers, about 3000 in strength, was raised, divided into companies, commanded by Officers of the Line and Indian Regiments, and superintended by non-commissioned officers and native headmen, these last also acting as interpreters.

The Chinese Coolie Corps was raised at Canton by Major Temple, for the transport of the munitions and stores of the army. The men received as pay nine dollars (or £1. 17s. 6d.) a month, and were supplied with rations and two suits of clothes. The coolies were dressed in Chinese jackets and loose trousers, while their feet were left bare.. On the jacket, both before and behind, within a black circular line, was inscribed the number of the individual, and below it that of his company separated by a black line. They wore bamboo caps with the letters C. C. C. (Canton Coolie Corps) painted in front.

The scum only of the population of Canton enlisted, as a rumour had spread about that the men were to be thrust forward to receive the brunt of battle, whilst the British, sheltered behind them, would fire away without danger to themselves.

The fearless conduct of the Coolie Corps at the attack of the Takoo Forts excited the admiration of the troops ; but being composed of thieves, pirates, and the lowest of the population, they could with difficulty be kept from plundering and committing mischief. The coolies used to slip away from camp and prowl about the neighbouring villages in search of plunder, and otherwise misconducted themselves, until at Tung-chow the General had one of them hanged as a warning to the rest.

Large quantities of stores were also conveyed by river to a point fourteen miles only from Pekin.

No animals were to be obtained at Singapore ; two or three thousand horses were, however purchased in Japan, but very few were taken out of the country, for want of sea transport. The war came suddenly to an end, and a large number, which cost Government twenty-five dollars apiece, had eventually to be resold for five dollars each.

The plan of employing the men of the Military Train, each to look after ten drivers and thirty animals, was found in practice not to have worked well. The private soldier does not possess the tact so much required when working with natives, and a superior stamp of man than what is generally found in the ranks is required to assume suddenly the charge of a number of men and animals.

The China War had no sooner been brought to a successful termination, than hostilities broke out in our colony New Zealand. of New Zealand, and Transport Corps had to be provided to enable the troops to commence operations against the Maoris.

At the breaking out of this war, which lasted from 1861 to 1865, there was no organized Land Transport in the country, and Deputy Commissary General Bailey, the same officer who had the direction of the Land Transport in the campaign in the north of China, was called upon to organize one. Government was fortunate in securing on this occasion the services of an officer, who had in a very recent campaign obtained great experience in this branch of the service. To find the same officer at the head of the transport in two following campaigns is a thing which, owing to our extended colonial possessions, does not often occur.

It is needless to say that under such an officer, in whose mind the shortcomings and defects noticed in the former campaigns were still fresh, the organization and working of the transport would not fail to become vastly improved, and the corps greatly increased in efficiency.

The formation of a Transport Corps was approved in June, 1861 and it was called the Commissariat Transport Corps. At first it was arranged to raise two companies, each of the following strength, viz., one Officer, one Staff Serjeant, five Serjeants, and 100 privates as

drivers, each private to look after two animals. The men were raised from the British Troops and Colonial Militia, and received extra pay at the following rates :—Officers, 9s. 6d. per diem; Serjeants, 2s. 6d.; Privates, 1s.

Other companies were formed as re-inforcements arrived, until, towards the close of the war, the strength of the Transport Corps amounted to 41 Officers, 125 Non-commissioned Officers, and 1341 men, with 1516 horses and 728 bullocks. A Battalion of the Military Train arrived in the country towards the end of the war, but the transport continued to remain in charge of the Commissariat. It was not likely that after three years' experience had imparted to the transport a certain degree of efficiency, it would have been transferred to the direction of an officer who had just arrived in the country. The Lieutenant-General Commanding in New Zealand, in stating his reasons for keeping the Military Train and Commissariat Transport distinct, says: "I believe that if the two corps were amalgamated, contrary to the expressed opinion of the Deputy Commissary General, any failure or irregularity in the supply of the troops in advanced positions might possibly be attributed to the want of direct control over the transport.

To obtain the necessary transport animals for the first two companies, 100 pack horses were ordered from Sydney, 50 horses for pack (at the maximum price of £20) and 25 for ambulances were purchased in Auckland, where 30 double-draught animals and 450 pack saddles were also contracted for.

Bullocks were purchased on the spot, in Taranaki and Auckland, the purchase of horses and bullocks in the latter place being entrusted to a board of officers.

Owing to pleuro-pneumonia prevailing in the country, bullocks perished in large numbers during the campaign.

A large portion of the transport in this war was performed by water; on one route alone the supplies had to change mode of conveyance eight times in a length of 111 miles. The depth of water up the rivers being very small, rowing boats to carry ten to twelve tons, and drawing two feet of water, had to be built; two companies of boatmen were raised for this service.

A pack saddle from the Cape was first used in the transport, but it was not found to answer, as it gave a number of horses sore backs; the Otago saddle was substituted for it with good effect. The carts of the country were also found superior to those supplied by the Military Store Department.

The expedition to Looshai and Duffla in India, and the war on the Gold Coast of 1873-74, afford good examples Looshia, Gold Coast Duffla. of transport done principally or entirely by

carriers. In the two first, the country in which the troops moved was hilly, whilst it was quite flat in the third, with the exception of the Adansee Hills. The roads, however, in all three led through dense forests, and in the latter, from Cape Coast Castle to Coomassie, a distance of about 189 miles, there was hardly a clear space even of a few acres to be found.

In Looshai, the success of the expedition was risked by the Indian Government directing a large portion of the transport to be given over to the control and management of the Commissariat. As previously remarked, the officers of the Indian Commissariat attend to both the supply and transport branches. The Quarter Master General, in a letter to the Secretary to the Government of India Military Department, with regard to this organization, in this instance remarked : "The Commander-in-Chief considers that the ordinary Commissariat superintendence is not sufficient to provide for the economical use and employment of the carriage, whether it consist of coolies or elephants, and that this carriage should be regularly organized with a sufficient staff of officers and subordinates."

General Bourchier, commanding one of the columns, in a report to the Quarter Master General, says : "I have acted directly in obedience to the orders of Government in making over the whole of the Commissariat coolies (about 2400) to Colonel * * * † I have done so under the positive orders conveyed to me, but utterly contrary to my own convictions. Instead of acting in an administrative capacity, Colonel * * * 's time is taken up in running about from station to station, trying to find out where the coolies are. On arrival in camp, there is no one to look after them : and from the Commissariat Officers being employed on duties alien to their legitimate position, I never can find out what Commissariat stores are to the front, or how many days' supply I may depend on, or how far I can with safety move.

"In fact I am, as far as military movements are concerned, at the mercy of the Commissariat, who have, with the exception of the Coolie Corps, complete command over the carriage, which they use as they, not I think best, and regarding whose whereabouts or efficiency I cannot get a report out of Colonel * * * , although he has frequently been called upon for the information I require."

In the other column the Commissariat Officer expressed his wish to the General Commanding not to be put in charge of the coolies ; the Commissariat Department, being already overworked, could not be expected to undertake the management of 1400 coolies over such a long line of operations.

In the Duffia expedition the Coolie Corps was kept intact as one body, with its own organization, under command of a Colonel in the

† One of the Commissariat Officers with the Cachar column.

army, to provide transport for all the wants of the force, and this organization was found to answer well.

On the Gold Coast a Supply Officer of the Control Department was first put in charge of raising and directing the transport ; but later on its direction was transferred to the officer in charge of the line of communication, with an adequate staff of officers to assist him.

Lord Napier proposed the following organization for the Coolie Corps for Looshai, viz :—

- 1 European Officer,
- 1 Assistant,
- 4 1st Class Subordinates,
- 29 Mates,
- 300 Men.

In the Duffla Expedition the corps consisted of four divisions, under a Commandant. Each division was as follows :—

- 1 European Officer,
- 3 Non-Commissioned Officers,
- 12 Sirdars, or Mates,
- 300 Men.

Each division was divided into three companies of 100 men, under a smart non-commissioned officer, with a sirdar, or mate, for each of its four sections.

On the Gold Coast there was no particular organization, and the strength of an officer's charge varied very much.

From *A Narrative of the Expedition to Looshai*, by Lieut.-Colonel (now Major-General) Roberts, V. C., we obtain the following information regarding the organization of the Coolie Corps :—

"The monthly pay of the carriers was fixed at eight rupees for carriers, ten for mates twelve for sirdars (headmen),

"None were entertained under twenty or over forty years of age, and the men came from the Punjab, Lucknow, Cawnpore, Allahabad, Chota Nagpore, and the neighbourhood of Darjeeling.

On enlistment the men received an advance of one month's pay; they were engaged for a period not exceeding eight months, and were allowed to make family remittances. In case of death, the man's family was to be allowed a gratuity of three months' pay.

The load carried was not to exceed twenty seers (40 lbs.) in addition to the man's own kit. Each man was supplied with—

- 1 blanket,
- 1 blanket jacket or loose coat,
- 1 pair of shoes,
- 1 pair of socks,
- 1 pair leg bandages, cloth,
- 1 havresack,
- 12 feet of good stout cord,
- 1 dhaor or kokery,
- 1 waterproof sheet between every two men.

The last two articles were to be returned into store.

The weight of the man's kit was very heavy, viz.:—

		lbs.	oz.
Blanket	...	...	7 0
Waterproof sheet	...	...	4 8
Cooking pots	...	...	4 0
Dhaor	...	...	1 12
Havresack with a day's ration, &c.	...	...	4 12
		<hr/>	
		22	0

The total weight carried was therefore 62 lbs., and this is a very severe load for a man to carry day after day in a hilly country. However, to keep the men in health, none of the above articles could be omitted.

For every 600 men there were—

- 1 Native Doctor,
- 1 Goomashta,
- 2 Moonshees,
- 6 Headmen,
- 24 Mates,
- 6 Havildars, Naiks, or intelligent Sepoys.

The men received free rations on the scale allowed for followers.

The weight carried by transport men in Looshai and Duffia was about 40 lbs.; but in China and the Gold Coast 50 lbs. was the regulation weight, though many of the loads never came up to that weight. In the latter country one carrier was allowed to each Regimental Officer, and one for the kit of three soldiers. The small 7-pounder guns were dismounted; the piece, slung on a stout bamboo cane, was carried by four men, a carrier being allotted to each wheel, and three to the gun carriage. The ammunition was packed in small cases, each case a load for one carrier. With rockets, one carrier conveyed the tube, and others each a bundle of six rockets. The men of the 2nd W. I. Regiment, native levies, and the Kroomen from the men-of-war, were employed for

a long time in duties of fatigue connected with the carriage of provisions and ammunition to the front.

The Abyssinian Expedition ranks with the Crimean War in the magnitude of its transport arrangements.

Abyssinia. The army had to march 580 miles to Magdala, over a country totally destitute of provisions, on roads very trying both to man and beast. Most ample details of everything connected with this expedition are to be found in the account of it written by Major Holland and Captain Hozier, and from which the following particulars principally are taken.

Instructions were forwarded by telegraph from England, as early as the 31st July, directing the collection of animals for the expedition to be set on foot in Bombay.

It being deemed impossible to obtain in India the large number of transport animals required, steps were taken by the Secretary of State for India for purchasing mules in Spain, Italy, and Turkey.

Colonel Clarke-Kennedy, of the Military Train, was appointed to direct the arrangements for obtaining mules north of the Isthmus of Suez, and the following officers were sent to effect the necessary purchases :—

Destination	Military Officer.	Commissariat Officer.	Veterinary Surgeon.
Alicante ...	Capt. Whinyates, R. A. ...	Assistant Commissary General Cumming.	Mr. Partridge.
Valencia ...	Capt. Wortham, R. A. ...	Assistant Commissary General Irving.	„ Bolton.
Barcelona ...	Lieut. Turnbull, R. A. ...	Deputy Commissary General Wingfield.	„ Harrison.
Majorca and Minorca.	Capt. Corlett, Mil. Train ...	... ...	„ Death.
Piedmont and Genoa.	Lieut. Roberts, Mil. Train	Assistant Commissary General Baynes.	„ Harpley.
Smyrna ...	Capt. Hobart, R. A. ...	Assistant Commissary General Downes.	„ Henge.
Scanderoon ...	Lieut. Bruce, Mil. Train ...	Assistant Commissary General Maule.	„ Tatam.
Antioch and Aleppo.	Major Dartnell ...	Ditto	„ Marshall.
Tyre, Sidon & Beyrouth.	Captain McNeil ...	Deputy Assistant Commissary General Casolani.	„ Fleming.
Samsoun and Trebizond.	Captain Webber, R. E. ...	Deputy Assistant Commissary General Furse.	„ Anderson.
Gibraltar ...	... ...	... ...	„ Field.
Spain, under Mr. Wetherell's contract.	... ...	... ...	„ Thacker.

These officers received above the pay of their rank £3 3s. per diem, to cover all extra expenses. Those ordered to Italy and Spain received an impress of £50, those to the Levant of £100.

The General Officers Commanding at Malta and Gibraltar were requested to have mules purchased in the vicinity of their commands, and consuls and other people were authorised, by the Special Service Officers to purchase for the Indian Government, receiving five per cent. commission.

Colonel Clarke-Kennedy established his head-quarters at Alexandria, and formed a dépôt there and a second one at Suez. His arrangements did not go further than Suez; steamers chartered by the Bombay Government were sent there to embark the mules and convey them to Abyssinia. To assist him in his duties, 8 Officers and 29 Non-commissioned Officers of the Military Train, two Commissariat Officers, and a Veterinary Surgeon were attached to him. With the Commissariat Officers rested all the arrangements for foraging and maintaining the muleteers and mules at the two depots, in Egypt.

The Admiralty chartered seven steamers for the conveyance of the mules to Egypt. Each steamer was furnished with head-stalls, compressed forage, and a steam hoist for embarkation, and had a Veterinary Surgeon on board, who took charge of the animals on the passage and handed them over to the officer commanding the dépôt at Alexandria.

Mules were to be inspected and passed by the Veterinary Surgeons, and none bought under four years of age, and each animal was to be branded on one hoof and on a flank as soon as possible after purchase. Attendants at the rate of one man per eight mules were to be engaged, to remain in Egypt for one month, being provided after that with a free passage home. Headmen were put in charge of twenty men, their pay being fixed at three shillings per diem, besides rations or compensation in lieu thereof. Each muleteer receive 1s. 6d. per diem, free rations on board ship, and ninepence in lieu thereof on service.

A printed card, signed by Colonel Clarke-Kennedy, was given to each man on his engagement: this had blank spaces for future entries, to be filled in by the officer who engaged him, and who signed across his card his promotion or reduction. A numerical roll of these cards was kept; all payments were entered on the same, specifying the date of such. Each man wore a numerical metal badge, the headmen also wore one, but of a different metal.

By the 6th November, 1867—otherwise in about a little over two months—Colonel Clarke-Kennedy reported his purchase of 8900 mules to have been completed

The order in which the following places are given shows the relative adaptation to the service of the pack animals purchased at each:—

Cyprus, Brindisi, Malta, Cairo, Smyrna, Gibraltar, Alicante, Valencia' Scanderoon, Beyrouth.

As for prices, Colonel Clarke-Kennedy thought he would be able to obtain about 2000 mules in Syria, delivered at Cairo for £25 each; but he purchased 250, and these were delivered at Suez for £26 10s. per maled. The railway fare for mules from Alexandria to Suez was thirty-three shillings per mule, including attendants.

The principal purchases appear to have been made in the following order:—Gibraltar, Smyrna, Beyrouth, Valencia Alicante, Cyprus, Scanderoon, Malta, Italy.

The total number of animals received by the Abyssinian Transport Train from Suez amounted to 10,045 mules, 1302 donkeys, and 741 camels.

The efforts for purchasing animals for a sufficient Transport Train were not confined to the north of the Isthmus of Suez, for agents were also sent to effect purchases in the Persian Gulf and in Arabia, and an order for the purchase of mules in the Punjab was issued.

From Bagdad and Bushire 1588 mules and 334 ponies were sent to Abyssinia. Most of the animals were conveyed to Bombay in native boats, the average price of each mule being Rupees 124-8, plus Rs. 50 for each animal delivered alive in Bombay.

In the Punjab, mules and yaboos (strong load-carrying ponies) were ordered to be purchased for the expedition at Rupees 224 and 150 each respectively,* and two depots were formed, one at Rawul Pindee, the other at Lahore. The total number of animals supplied by the Punjab amounted to 2641.

It is worth remarking that in Abyssinia the drivers from the Punjab were found to be the best of the whole employed during the expedition, and the Muzbee Sikhs the strongest and most enduring men; in the Duffla Expedition the Muzbee Sikhs and the Punjabee Cahars were the best amongst the carriers.

* The maximum price paid for animals for the expedition to Bhootan was—Mules, Rs. 180 ; Yaboos, Rs. 120.

In Turkish Arabia, the camels, horses, and buffaloes are of superior quality. The horses are numerous, and of the best Arab blood. The mules from the district between the Tigris and the Persian frontier, and the asses of Bagdad, are famous. In Anatolia the best breed of camels is a cross between the Bactrian and the Arab camel. The Arab camels from Mesopotamia cost £7 or £8 each. Strong thick-set horses cost from £3 to £7, a pair of oxen £6, a pair of buffaloes £8 to £13. Smyrna is the chief port of Anatolia. In the island of Bahrein in the Persian Gulf are to be found large donkeys exceeding in size those of Egypt and Syria.

The Jats and Lobana castes of Sikhs possess in a high degree the useful knowledge of the lading and care of beasts of burden. In olden days the people of the Lobana caste were the carriers of the country.

Forty-four elephants were shipped at Bombay for Abyssinia. The animals proved a great acquisition to the Force, and were mostly used in conveying artillery.

Sir Robert Napier wished to organize a Land Transport Corps under the Quartermaster General, removed from the control of the Commissariat, as he considered that the ordinary Commissariat superintendence was not exactly what was required for the efficient working of a corps of such large proportions. He proposed Major Warden, an officer who had served with the Land Transport in the Crimea, as Director, and caused him to prepare what he considered was a desirable organization for a Transport Corps.

The proposed organization, when submitted to the Bombay Government, did not meet with the approval of His Excellency the Governor, who, basing his arguments on the Report of the Committee on the Administration of the Transport and Supply Departments of the Army of 1867, disapproved of the Transport being placed under other authority but that of the Commissary General, and found the organization proposed by Major Warden too elaborate and complicated; he also objected to the subdivision of the whole transport into divisions.

Sir Robert Napier was obliged to abide by the decision of Government, but insisted on a complete organization, particularly on the score of the mixture of races amongst the drivers. The Government, however considered one officer capable of looking after 1000 animals, and the whole transport, divided into troops of 100 mules, each under a native officer, to be sufficient.

On the 12th September, 1867, a Government Resolution placed the Land Transport Corps, on arrival in Abyssinia, under a Controller of Supply and Transport, and sanctioned the organization proposed by the Commissary General of the Bombay Army.

20,000 mules or pack bullocks and 8000 camels were deemed necessary for the force, and 14 Captains and 28 Subalterns were detailed for duty with the transport. Volunteers were called for from the non-commissioned officers and men of both European and native Regiments to fill the posts of superintendents,

The following men and animals were collected in different stations of the Bombay Presidency:—

Poona—

- 1000 ponies,
- 4000 pack bullocks,
- 1800 muleteers,
- 1600 camel drivers,
- 560 dhooly bearers.

Kurrachee—
200 dhooly bearers.
 Dacca—
100 camel drivers,
80 muleteers,
200 dhooly bearers.
 Belgaum—
50 muleteers,
100 dhooly bearers.
 Bombay—
300 camel men,
200 muleteers.

In Abyssinia were bought 3130 mules.

In the month of January the state of the transport at Zula was anything but encouraging. Mules were landed without even a rope to picket them with, and, there being no one to take charge of them and being consigned to no one in particular, they were cast loose on shore, where they roamed about in search of forage and water, and many died. At last parties of soldiers were sent to hunt them up, and by the help of long ropes captured a good many and took them to the depots.

Many of the animals on landing, particularly camels, were found unfit for work. The muleteers from Egypt misconducted themselves, many deserted, and the rest were sent back. These men had been promised warm clothing, boots, and other articles of kit, which could not be provided; they had no cooking utensils, and interpreters to understand their complaints were wanting; they became insubordinate, and were flogged and sent away.

The causes of all this confusion and disorder were, that insufficient officers and men were at first sent out to receive and take charge of the animals on landing; the want of a head at the port of debarkation; want of experience in working a Mule Train, both in officers and men; the exaggerated reports of the supply of forage and water procurable at the place of landing; lastly, that animals, drivers, and equipment were put on board of separate ships.

In the middle of the month of February the Train was divided into two sections: the Highland Train, composed of the Rawul Pindee and Lahore Mule Trains, with A and D Divisions of the Bombay Train, was to work over three hundred and seventeen miles of road, from Senafé to Magdala; the Lowland, composed of three divisions of mules, three of pack bullocks, three of camels, and one of carts, was to bring provisions, &c., from Zula to Senafé.

The Highland Train worked well; but, notwithstanding the several reductions of camp equipment, baggage, &c., on the way up, had not the inhabitants of the country come forward to carry loads, it is doubtful

whether the troops would have reached Magdala. On the return of the force a good part of the road had been improved and made available for carts.

Transport Train sick animal depôts were formed seventy-five miles from each other, with officers, charged with receiving mules and other animals, of which a great number fell sick owing to insufficient and bad fodder and hard work.

The above is only a very brief account of the steps taken for providing our armies with means of transport in some of our former wars; it would materially help in future cases if we could ascertain, however approximately, the total amount of transport that would be required for a given force.

The tables showing the war strength and composition of one of our Divisions and Army Corps show what is deemed necessary for the conveyance of baggage, camp equipage, intrenching tools, Infantry and Artillery reserve ammunition, field hospitals, sick and wounded, bakery and butchery trains, and two days' provisions and forage—what, in fact, may be taken as the known quantity. No mention whatever is made of the transport required in excess of this for the commissariat supplies to be moved in rear of the army, a quantity which always varies according to circumstances.

The strength of an Army Corps is given at 36,993 of all ranks, with 12,849 horses and 1573 carriages. Taking the soldier's ration, exclusive of meat, at 2lbs. per diem, the weight of three days' provisions to follow an Army Corps would amount to 221,958 lbs.; this, with three days' more to follow still further in rear, would give a total weight of 443,916 lbs., requiring for its transport 201 carriages and 804 horses.*

Hay or straw for the horses will seldom be carried, as these bulky articles would greatly augment the transport of an army. These must be obtained in the country where the army is operating, either by requisition, or by parties going out to cut the standing crops. However, in some cases (notably in the Afghan war, where no forage was to be had, and numbers of horses died, or became unfit for work, owing to the great scarcity of food), we may have to move cavalry and transport animals through a country entirely wanting in forage, and must make provisions for its carriage.

* Weight of general service wagon, 16½ cwt.	1820 lbs.
Weight of load	2212 lbs.
<hr/>	
	4032 lbs.

Weight for each horse, 9 cwt.

The weight of load for country wagons drawn by four mules or bullocks would be 1600 lbs.

Taking the forage for each horse at 22lbs., we find 848,034lbs., required for three days; the same amount for three other days, to follow with the provisions still further in rear, will give a total of 1,696,068lbs. demanding 767 carriages, with 3068 horses. The total transport required for six days' provisions and forage to follow an Army Corps, will therefore amount to about 968 carriages, with 3872 horses.

The strength of a division—10,154 of all ranks, with 2450 horses and 320 carriages—approaches more to the strength of the expeditionary forces we have employed in such countries as China, New Zealand, and Abyssinia. The transport for six days' provisions and forage for this will amount to 147 carriages, with 588 horses. To these totals must be added a certain percentage of spare animals, which can be calculated to amount to from 10 to 20 per cent. of the above numbers.

The calculation for food and forage has only been made for the actual number of all ranks in the detailed table of Army Corps and Divisions; no account has been taken of food and forage required for men and horses of the provision columns.

Deputy Assistant Commissary General Bailey, at the close of his report on the transport in the campaign in the north of China, gives the following estimate of what he considers the lowest amount of transport required for a force of about 9000 strong:—

Estimate—Carriage for

Regiment of Infantry, say 800 strong.

80 tents, with waterproof sheets, bill-hooks, and camp lbs.	
kettles for men, at 100 lbs each.....	8000
800 blankets, at 3½ lbs. each.....	2800
112,000 rounds of small arms ammunition, being 140 per man, at 120 lbs. per 1000 rounds.....	13,440
12 officers' tents, at 100 lbs. each	1200
35 officers' baggage, at 100 lbs. each	3500
Ambulances for carriage of sick, at 5 per cent. of the force, 40 men, equal to 200 lbs. each.....	8000
Medical panniers and hospital comforts, say	1200
	—
	38,140
	—

Regiment of Cavalry, say 400 men and 400 horses.

50 tents, with waterproof sheets, &c, for men, at 100 lbs. each	5000
800 blankets (one per man, one per horse), at $3\frac{1}{2}$ lbs. each	2800
60 rounds of spare ammunition per man, 24,000 rounds at 120 lbs. per 1000 rounds	2880
20 officers' baggage, at 100 lbs. each	2000
10 officers' tents, at 100 lbs. each.....	1000
Picket posts and ropes for horses, say.....	3000

	16,680

Equal to 14 wagons, at 1200 lbs. each.

A Battery of Artillery, say 200 men and 160 horses.

25 tents, with waterproof sheets, &c., for men, lbs.	
at 100 lbs. each 2500	
200 blankets for men at $3\frac{1}{2}$ lbs. each 700	
5 officers' tent, at 100 lbs. each 500	
8 officers' baggage, at 100 lbs. each 800	
Picket ropes and pins for horses 1125	
609 rounds of field ammunition, at 14 lbs. 8400	

	14,025

Equal to 12 wagons, at 1202 lbs. each.

Royal Engineers, say 400 strong.

The rate of half a Regiment of Infantry ... 19,070	lbs.
Equal to 16 wagons, at 1200 lbs. each.	

Royal Engineer Park (ordinary).

For Field Service 14,400	lbs.
Equal to 12 wagons, at 1200 lbs. each	

General and Brigade Staff.

Baggage and tents of, say 14,400	
Equal to 12 wagons, at 1200 lbs. each	

Thus—

	Officers and Men.	Char- gers.	Wagons.
8 Regiments of Infantry (32 wagons per Regiment) ...	6400	100	256
3 Regiments of Cavalry (14 wagons per Regiment) ...	1200	1200	48
4 Batteries of Artillery (12 wagons per Battery) ...	800	640	48
Royal Engineers	400	30	16
Royal Engineer Park ... ... ...	...	...	12
General and Brigade Staff	25	50	12
Commissariat Staff for 5 Brigades, including baking, butchering, and mining implements ...	70	10	25
Total ...	8895	2030	411

Commissariat Supplies.

Three days' provisions to accompany the Force—

27,000 rations provisions, at 3 lbs. ...	...	...	lbs.
6,090 rations forage, at 22 lbs. ...	...	...	81,000
Three days' provisions and forage to follow the Force—			133,980
Provisions ... ... ...	...	...	81,000
Forage ... ... ...	...	...	133,980
		429,960	360
			771
To this must be added 25 per cent. for casualties, as this branch will certainly sustain, from sickness, breakage, and other causes, more loss than any other part of the Force.			193
Total wagons ...			964

To work the 964 wagons it will take—

	Num- ber of Horses.	Number of Men.	Wagons.
4 Horses to each wagon	3856		
1 Man to a pair of horses ...	...	1928	
6 Non-commissioned Officers to 20 wagons ...	...	289	
1 Riding horse to each Non-commissioned Officer ...	289		
1 Commissioned Officer to 20 wagons (mounted) ...	48	48	
A Senior Officer and Staff, to control say 9 Officers, 10 Clerks ; Officers mounted, each 2 horses ...	18	27	
Veterinary Surgeons, mounted ...	8	8	
Shoeing Smiths, 2 to 20 wagons, with 1 forge complete, drawn by 2 horses, and medicine chest attached ...	96	96	48
1 Carpenter and harness-maker to 20 wagons, with cart drawn by 2 horses for tools ...	96	96	48
Total strength of Transport ...	4411	2492	1060

Deputy Assistant Commissary General Bailey provides in his estimate sick carriage for only 340 men, which is not 5 per cent. of the whole force; whereas it is generally considered necessary to make provision for 10 per cent. of sick.

In his report on the French Military Transport in the campaign in the Crimea, Lord Strathnairn gives the strength of the French Army as having reached the number of 150,000 men; the number of transport animals is given by him at 14,000, or about one animal for ten men. The French Army here was stationary, the only detachments away from Sebastopol being one at Eupatoria, another, of 12,000 men 1,700 horses, in the valley of Baidar. General Macdougall, in his *Theory] of War*, says: "The estimated number of animals required to enable our army in the Crimea of 30,000 men to take the field with efficiency] was upwards of 20,000."

In the campaign in the north of China, for a force, all told, including followers, of 22,000, with 6,000 animals, the transport consisted of—

Horse and Bullock transport	...	...	2,500
Coolies 2,500 (or at the rate of four coolies to one animal)	...	...	625
			<hr/>
			3,125

or one animal for each seven men.

In the New Zealand War the strength of the transport varied with that of the force engaged; a return on the 1st May, 1864, shows 15,017 men, with 2,244 transport animals, or nearly one animal for seven men. It should be noticed, however, that the forces in New Zealand had hardly any Cavalry, the little there was, about 500 men, being furnished by the Colonial Defence Force; further, that in both the China and New Zealand Wars there was plenty of water transport besides the land one, so these figures would mislead if taken to embrace the whole of the transport available in these two campaigns.

In Abyssinia, according to the Assistant Quarter Master General's return on the 1st April, the month in which Magdala fell, we find a force of 12,601 men and 14,500 followers, in all 27,101 men. At the date of the capture of Magdala the number of transport animals amounted to 28,835, of which 3,565 were sick.

The return of animals received in the Transport Train from the beginning to the end of this campaign shows that 41,723 animals were received from all sources. The difficult state of the roads, and the insufficiency and bad quality of the fodder, obliged a large reduction of the loads to be often resorted to.

Deputy Assistant Commissary General Bailey estimates that carriage will be required for each man of the force at the rate of $5\frac{1}{2}$ lbs.,

more 3 lbs. per diem for rations, and 22 lbs. per diem per horse for forage. He makes no allowance for the camp followers, who in many of our expeditions have to be subsisted just the same as the fighting men.

In proportion to the length of the objective from the base, the unhealthiness of the climate and the poorness of the country, as was exemplified so well in the case of the Abyssinian Expedition, so will the number of our transport animals increase until it equals, if it does not surpass, the number of the troops engaged.

The difference in the strength of the transport employed in former wars will show how next to impossible it is, with our varied wars and expeditions, to lay down, with any degree of approximation even, the amount of transport that will be required for a certain numerical force entering on a campaign ; this arises from the special organization which seems to be adopted every time our armies take the field.

Were we to conform, however, in every war to certain details of organization—for example, those issued with the Army Circulars of 1877—and depart from them as little as possible, or were other details for a smaller force, say of the strength of one Division, adopted for use in distant and difficult countries, then the strength of the transport required would cease, but in very exceptional cases, to be a difficult quantity to estimate. Then the experience of succeeding wars in this important department of the army would come useful, as the organization in each successive case would undoubtedly adopt the improvements found necessary on service, and the efficiency of the transport would not fail thereby to be found greatly increased.

(To be continued.)

V.

LECTURE:

Tuesday 30th July 1878.

COL. THE HON'BLE SIR A. CLARKE, K. C. M. G., C. B., R. E., IN THE CHAIR.

THE AUSTRIAN CAVALRY.

BY MAJOR A. H. PRINSEP 11TH (PRINCE OF WALES' OWN) BENGAL LANCERS.

It was my good fortune to be present at the manœuvres of the Austrian Army last year and I have in consequence been honored by a request from the Council of the United Service Institution to lay before its Members the information I was able to gather regarding my own branch of the Service, viz., the Cavalry.

I arrived in Vienna some little time before the commencement of the manœuvres and received permission to visit the barracks of the two Regiments quartered there, a Dragoon Regiment and a Hussar corps.

As you have doubtless heard, the Austrian Army has since 1863 been reorganised on the same system as that of the Prussian Army. The men serve but three years in the active army, and are then drafted into the first reserve.

Not only is this system rigidly enforced, but Officers Commanding Regiments are ordered to discourage even their non-commissioned officers from re-engaging.

The difficulties under which the Austrian Cavalry Officer labors will at once be apparent to his brother officers in more favored armies.

In both British and Native Cavalry it is not uncommon for a recruit to be one year in riding School, and even when dismissed from School, he has to pass through his Musketry course. This system would never do under the three years rule so the drill in the Austrian army has been remodelled by General Edelsheim to suit the new conditions of service. The great precision in dressing required in our Cavalry has been done away with. Placing markers after each movement, and the exact dressing of the force have been abolished. Quickness of movement and general mobility are the sole principles laid down. The Squadron is the unit and its Commandant is responsible to his Colonel for not only its discipline but also for the instruction of each one of its troopers from the moment he joins its ranks as a raw

recruit. In Vienna and a few large towns the Regiments are together in barracks, but the great mass of the Austrian Cavalry are cantoned in the country ; the Squadron Commander occupying a Central village, and each of his Subalterns with a division or "Zug" being quartered in villages near to him. For if I remember rightly, two months of each year the Regiment is assembled at Head Quarters and either takes part in General Manceuvres, or has drills of its own. I had gathered this much information before my visit to the barracks so that I was very anxious to see how the recruit was made a horseman in the rapid manner essential to their short service.

I found Riding Shool being carried on in the open Barrack Yard,
Riding School. and the first thing that struck me was that
from the first day of his School the raw recruit
was put into a saddle and his stirrups adjusted, his legs being placed
in the proper position.

A head stall and longing rope are attached to the horse which is selected as a particularly quiet animal, and for the first few days the recruit is walked and trotted in circles, without reins, to give him confidence, and to teach him to hold on to his saddle with his legs and not to maintain his position by the animals mouth, by means of his reins.

Riding School goes on both morning and evening. The next stage of instruction is with a snaffle bridle, but should the recruit appear to press unduly on the horses mouth, the bridle is again taken off and a back board passed between his elbows and across his back. Until the recruit has thoroughly learned to sit on his horse without the aid of his hands he remains at the "Longe." The Austrians maintain, that by placing the recruit from the "first," in his saddle and with his stirrups, he the more easily acquires the seat he is to ride in for the rest of his life and that he has thus nothing to unlearn. It is only after the trooper has learnt to ride that his stirrups are taken away from him.

The seat of the trooper is very different to ours. His stirrups are shorter even than the present regulation Cavalry seat. Within the last few years our own Cavalry seat has been greatly changed, and the men ride at least two holes shorter than they used to do. In the Austrian Cavalry the stirrup is so short that the men's feet are drawn back, and are not perpendicular from the knee downwards, they are allowed to rise in their stirrups. Many of our Bengal Cavalry Regiments have adopted this plan, and now that the whole of our mounted force ride with shortened stirrups, it appears to me that the days of "Bumping" are doomed.

I am aware that the advocates of the non rising system maintain, that sore backs ensue from the hunting seat but my own experience does not lead me to this conclusion. No doubt it does not look well to

see a regiment trot past an Inspecting General with the men rising in their stirrups, and for this one manœuvre they might be told to adopt the old system, but now that the trot is recognised as the proper pace for Cavalry even on the march, anything that both eases the horse and is a comfort to the man, should surely be sanctioned. I venture to express this opinion with due deference and trust that the many distinguished Cavalry and Artillery officers now present, will express their opinion on this subject; the rest of the riding drill did not strike me as differing sufficiently from our own to call for remark. After riding school I walked through the stables. The horses of the Hussars appeared to me to be much of the same stamp as that in our Bengal Cavalry.

They shew great traces of the Arab Sires largely used at the Imperial stud and seem well up to their work. I liked them better than the troopers supplied to the Dragoons which were heavier animals with less breeding.

The price of the Austrian Cavalry trooper is two hundred and fifty Gulden at three years old. The artillery remount costing I believe 400 Gulden. The Gulden is supposed to represent two shillings, but with the present depreciated currency the rate of exchange for the English Sovereign is from eleven to twelve Gulden. Large numbers of horses are exported from the great breeding countries and supply both France and Germany with remounts. But this draw upon horse flesh is at once stopped by imperial decree, directly any even remote chance of war arises. For instance no horses have been allowed to pass the Austrian Frontiers since the Eastern complications arose. The chief breeding countries are Hungary and Poland, but especially the former. The Hungarians are essentially a nation of horsemen, and no Hungarian will walk a yard if he can get any sort of animal to get on the back of. The imperial stud at Kisber is known to us all, for was not Mr. Baltazzi's celebrated Winner bred and named after that place. I am sorry to say that I had no opportunity of visiting this Harras. The Government allow all mounted officers to select horses from this stud at very low rates, and I saw many magnificent chargers, that had been procured in this manner.

The stables were not so well cared for as those of an English Cavalry regiment, and in many regiments they told me the litter was only carted away once a month, fresh straw being daily placed on the soiled litter. This system is most objectionable and the result shews itself in numerous cases of ophthalmia both amongst the men and horses. Its sole advantage is the higher price obtainable for the litter.

I next walked through the barrack and inspected the men's accoutrements; throughout the Austrian Army, the carbine is carried across the soldiers' back. The sling is much the same as that formerly used by many Bengal Regiments, except that there is an extra buckle and strap in front

of the man's chest by which he can disengage the carbine if necessary without passing it over his head. I would venture to bring to special notice that the English Cavalry is I believe the only one that carries its carbine on the horse and not on its rider. In Lancer Regiments this is still more difficult to manage for both carbine and lance being on the off side without any counter balancing weight must tend to drag the saddle towards that side. The carbine itself is heavier than the Martini Henry and does not carry so far, being, if I remember aright, only sighted to 400 yards. The sword is carried by the old sling in a steel scabbard and struck me as being both heavy and badly balanced. The saddles are less cut out than our own—I mean that the seat is flatter and the cantle and pommel lower. No Valise is carried on the horse as a cart is provided for each squadron. The saddle has no panesl but rests on the wooden side boards only—a blanket is folded in four and is first placed on the horse on this the saddle rests. The side boards appeared to me to be shorter than our own but on inquiry I found that they were very liable to rub the horse at the extreme end, and that pieces of felt were provided by many Squadron Commanders to fit on to the ends and obviate this fault. The blanket is made so as to fold exactly into four and is used to cover the horse when at his pickets. No doubt the extra weight of a saddle cloth, or numda, is thus done away with, but at the same time this system has many disadvantages. In wet weather for instance the blanket becomes difficult to fold and would in my opinion be liable to chafe the horse's back. Thus again if not folded correctly, the same result would arise, and in the hurry incidental to service this would be no uncommon occurrence. I should imagine too, that the blanket was hotter to the horse's back than the felt one is with us.

I believe that a new saddle is now being issued to the British Cavalry less cut out than the old pattern "Nolan" but as yet I have not had the opportunity of seeing one.

Whilst at Vienna I had no opportunity of seeing the Cavalry drill as the whole garrison were daily employed on under going a preliminary course of instruction in sham fighting preparatory to the grand manœuvres.

Each morning a small force, composed of all three arms of the service, manœuvred against a force of equal strength, for instance half a battalion, two guns and a squadron marched out due South, whilst an equal force proceeded due West, and after marching two miles from the point of departure began to feel for its enemy. The same plan was carried on from the North and East gates of the city. The command was given in turn, each morning to a fresh officer; the Colonels of Regiments with the Etat Majors acting as Umpires. An opportunity is thus afforded to all Captains of manœuvring the three branches of the service. The large Staff kept permanently up, is by this means too exercised in the very difficult duty of umpiring, as directly after each day's fight, all officers

are assembled on the ground fought over, and all faults pointed out whilst the attack and defence are criticised. By this means not only the combatant officers, but the Umpire Staff are educated before the divisional manœuvres are held.

Last year the camps of exercise as we should call them in this
 Manœuvres. country were formed in three places. The first
 at Bröck of a Corps or Division, a second at
 Cashaw of two army corps and a third of cavalry and artillery only at
 Seigletz. As my subject is the cavalry only, I need not dwell on the
 manœuvres at Cashaw or Bröck, although I should wish to mention the
 good riding of the Hungarian Honved Cavalry answering to our
 Yeomanry. This force consists of both Infantry and Cavalry and
 is of considerable strength—the men are only called out for a short
 time each year, and like our Militia and Yeomanry are under the
 control of the Hungarian Parliament, the Infantry did not impress
 me greatly. The Hanved Cavalry however are wonderfully good. As
 I have already said the Hungarian is a born horseman. He cannot
 only ride but is fond of his horse and knows how to take care of him—
 then too, the Cavalry is officered by the Aristocracy who take great
 pride in the efficiency of their several Regiments. I have not got my
 notes with me, so cannot say the terms of their service, but if I remember
 rightly, the horse is the property of his rider, although Government pays
 the owners some bonus to maintain a lien on its services. The national
 rising in 1848 bears evidence of what the Hanveds generally are capable
 of, and the bitter feeling against Russia for her conduct during that year
 is as strong now as ever.

I will now try to tell you what I saw at Seigletz. This is a
 small town situated in the plains of Hungary, and the country is admirably
 suited for Cavalry. But few obstacles occur and these are easily
 surmounted. As far as I can remember some 6,000 Cavalry with 6
 battalions of Artillery were collected on our arrival. The first two days'
 were devoted to equal forces manœuvring one against the other, and
 resolved itself into a series of charges. I was much struck with the
 rapid way line was formed, and can only attribute this to the "Zug"
 system. The "Zug" answers to our half troop and seems to have entirely
 superseded the column of fours. The only men who mantain their posi-
 tions in their "Zug" are the men on the flank. I shall be able to ex-
 plain this better when describing their manner of passing a defile. The
 advance was invariably executed at a smart trot, either by column of
 half troops or whole troops. I never saw a formation by fours during
 the whole camp. The men rode right well, and although there were
 several small ditches, I only saw two men dismounted during the three
 days. The officers were very well mounted and were one and all in the
 prime of life. Great stress is now laid on the necessity of rapid pro-
 motion in the mounted branches of the service, and a scheme of retire-
 ment is now in force by which the average length of service, before get-
 ting the Command of a Regiment is twenty years. A School of Ins-

truction in Military Equitation is held at Vienna, and no officer is promoted to Captain until he has received a certificate of equitation. Regimental races and steeplechases are greatly encouraged and inquiries are being made as to the possibility of introducing Polo. The second days proceedings did not differ from the first, but on the third day the idea laid down supposed one force to be the rear of a retreating army and the other the advance guard. During the retreat we came to a bridge across a nullah and as the column was formed in "Zugs" and the bridge was too narrow for more than 4 horses abreast, I was anxious to see how the passage would be accomplished. No orders were given to the Zugs, but as many horses as there were room for, pressed accross the bridge, the remainder falling back and galloping up into the "Zug" directly they were able to do so. But little checking of pace took place, though at the bridge itself, all seemed in confusion, and I doubt, if with our strict drill we should have been able to get accross as quickly. This was all done too at a smart trot, so that the more credit is due. The ten rear Squadrons diamounted and held the bridge, whilst the remainder took up ground some mile to the rear. The enemy eventually forced this bridge, and two more on the left, and advancing, and delivering a final charge before their supports were sufficiently formed, they were adjudged to be defeated. I have mentioned General Edelsheim as the chief author of the new system and to him and the Inspector General of Cavalry. General Count Peackiwitz the efficiency of the Cavalry is chiefly due. The discipline is very strict both for the officers and men, and I will illustrate this by narrating what occurred to one of the officers appointed to look after the Emperor's guests. Some little time before the manœuvres, this officer was quartered at Buda, Pesth, and on the evening told his Bat man to go into the town early in the morning to bring a horse brush. General Edelsheim Commanding the Garrison was away on Inspection, so the man put on his old clothes, and proceeded on his errand bought the brush, and whilst strolling home, stopped on the bridge across the Danube to lean over and watch a steamer pass. His coat was still good, but his overalls had seen their best day, and his position leaning over the Parapet was not the one he should have chosen to shew them off. A carriage stops and a sweet voice calls, " Oh my Son come hither," and to his horror he turns and sees General Edelsheim, " To what corps do you belong ? to whose troop ? and whose servant are you ?" are quickly asked, and the man is told to get up beside the coachman and the General drives straight to barracks. The Officer Commanding the Regiment is sent for, with the Officer Commanding the Troop and the man's own master. The Colonel is confined to barracks for three weeks, the Captain 14 days, and my friend close arrest for a week, all because the patch of cloth was not of the same color as the original fabric.

On another occasion when inspecting the Hospital in the Mortuary chapel attached, he observed a cord suspended from the ceiling, and was informed by the Surgeon General, that as years before a supposed dead man had come to life again, it had been ordered that for the future a

string was to be attached to the finger of all corpses, any movement of the supposed dead man would thus by jerking the string sound a bell and summon assistance, a special man being told off for this duty. "An excellent idea," said the General and to the horror of his staff he proceeded to lay himself on the table and tie the string to his finger. The Doctor got nervous for although the General jerked the string, no bell rung, nor did any one appear, and the General gravely getting up, put all the Medical Staff under arrest.

I have not mentioned the dress of the men. The old national Dress. color white has been discontinued. No color

looked smarter, and its advocates maintain

that the white cloth, not being eaten by any dye, lasted longer and was warmer than the blue now issued. Still the white has been doomed, and but few men are now seen in their old national color. All the mounted men wear Hessian Boots, into the heel of which the spur is screwed; to an English eye, accustomed to the strap and buckle, the Austrian method appears bald and ugly, but their spurs are rarely lost. The overalls fit pretty tight but the jacket is more like a Norfolk jacket, and is loose. A pelisse is worn by all Hussars slung over the left shoulder. This is only put on in cold or wet weather, and although it adds much to their appearance, must be very inconvenient when worn slung round the neck. But little difference is observable between the dress of the officers and men. In these days of far shooting small arms, I would venture to lay great stress on this point. The Staff dress is even plainer than that of the rest of the army. The great coat, to which is attached a hood, is carried in front of the saddle and over the Wallets in which a few necessaries are packed. I had no opportunity of examining the equipment of the Lancers or Uhlans, as in the German army they are called, but I was glad to see that the Lance "La reine des armes blanche" as it has been named by a great authority, was fully appreciated in Austria. Their Lances are shorter than ours, but being made of ash, this is necessary. In India we possess the natural Lance in the Male Bamboo,—a wood lighter for its size, tougher and better adapted as a Lance, than any other wood in the world. The Austrian Lancer regiments are chiefly raised in Poland, where the Lance is looked upon as the National Weapon. The men are armed with a sword and pistol as with us and probably a percentage carry carbines, but I am not certain of this. When in England, last March, I was told on good authority, that it had been decided to arm the whole of the Lancer Regiments with the Carbine as well as the Lance, and that a special attachment was to be issued to enable the men to leave their Lance on their saddles when acting on foot.

The English system of messes for officers is maintained in but few Regiments of the Austrian Army. In one Regiment, but a few years ago, not only was a mess maintained, but English was the language of the mess room. Now a days, but few English remain under the Austrian colors, as the same encouragement is not held out to foreigners, as used to be offered.

I cannot conclude my lecture without expressing my thanks to my brother officers in the Austrian Army for the kindness and hospitality I received on all occasions from them. The interest they felt in the Indian Army was shown by the numerous questions they put to me, and I only regret, that a worthier exponent of their merits was not present to represent Her Majesty's Imperial Forces.

Many writers since the introduction of breech loading rifles have declared that the days of Cavalry are past and that except for scouting and acting in advance of the main body, they were of no use. The Prussians and Austrians have surely negatived this idea, for since the war of 1866 and that of 1870 both Governments have not only largely increased their Cavalry, but have also in their Regulations laid down the great importance of using their Cavalry on the field of battle. The real difficulty will always remain viz. when to launch your horsemen at the enemy, opportunities will always occur, and it is for the Cavalry leader to know when to seize them.

For my own part, I feel confident that the highest exploits, recorded in past History, will, in the future, be at last equalled by the deeds of Her Imperial Majesty's Cavalry,

I feel that the subject that has been allotted to me deserves a more exhaustive treatment than I have been able to bestow on it in this lecture, but should I have been able to draw attention to any points of interest or importance to my brother cavalry officers, as well as to any other who are here present, I shall feel that my short experience of Austrian Cavalry has not been thrown away.

Mr. President, Ladies and Gentlemen, I have to thank you for the very kind attention you have given me this afternoon.

At the conclusion of the above paper, the following by Lt. Martin Martin, R. E., was read to the meeting :—

There is one point on which I may, as an Engineer Officer be allowed to speak and that is the great superiority of the Austrian Cavalry Pioneer organisation as compared with our own, which is copied from theirs but far behind it.

Continued efforts are made in Austria to render Cavalry independent of Engineer assistance in all their varied duties, and the following orders published in the " Neue Freie Presse" of the 11th June 1878, on the destruction of railways, may be of interest.

" The Pioneers of cavalry regiments have just been provided with the necessary tools and appurtenances for the destruction of rail-roadways. In order to provide them with as rational an instruction as possible and above all to familiarise the pioneer division Lieutenants with the management of explosives, the minister of war has decided that the

commandants of pioneer divisions shall assemble to take a part in the Engineer Corps exercises at the polygons of Vienna, Prague, Pesth and Cracow from the 1st to the 11th July 1878. In each of these places a captain of engineers will be nominated to direct the exercises and will have attached to him when necessary, N. C. O.'s and sappers of Engineers, The exercises will be limited to the following points :—

Practical instruction on the use of tools ; dismounting and carrying away rails and sleepers ; rendering rails unserviceable ; description and use of cartouches and rail-torpedoes used by cavalry ; how to cut and blow up rails and sleepers, points and crossings, reservoirs, telegraphs &c.

Such instruction can only be most serviceable.

VI.

DISCUSSION ON MAJOR ST. JOHN'S LECTURE ON "PERSIA."

Discussion was raised by Major Henderson, C.S.I., who expressed a wish that Major St. John, who had dwelt a good deal on the strategic importance of Persia as regards any Russian movement down the valley of the Tigris, would explain himself more fully on this point.

Major St. John said :—"The subject is one of very great interest, but I did not dwell on it much in my lecture ; for it seemed to me to appertain more to Afghanistan than Persia. It is well known that for a great many years, in fact, since 1837, or thereabouts, the possibility of the Russians attacking India in alliance with Persia, and perhaps Afghanistan, has been a matter of great interest, and perhaps it may be said alarms both in India and England. It was very nearly causing war with Persia in 1839, as explained in the lecture, and actually did cause war in 1856-57. Now it is the published opinion of at least one distinguished soldier, that Russia's efforts in this direction had been not exactly and entirely a blind to conceal her projects in the Tigris Valley ; but made, among other objects, with the idea of annoying and irritating England to such an extent as to cause her fear for the safety of India to make her leave Turkey and Turkish Provinces in Asia unguarded. I own that I agree with this view, and do not believe that Russia has any idea of conquering or invading India, except as a vague and remote possibility. It is true, no doubt, that the hope of invading India through Afghanistan is prevalent in the Russian Army ; but it is encouraged by the Russian Government solely, I believe, with the object of frightening India into letting Turkey shift for herself. It is a sort of red rag fluttered before the eyes of John Bull to turn his attention from more serious issues elsewhere. In the first place, the line of advance from the Caspian to India, or even from Turkestan to India, is very long and very difficult, would require enormous preparation and immense pecuniary recourses. The Valley of the Tigris, on the contrary, is close to the Russian Frontier. In the Caucasus, Russia regularly keeps up an army of 150,000 men ; and, as we have seen in the last war, she was able to dispose of 40,000 to attack Turkey in Asia. Whereas we know by our own experience the enormous labour that would attend the assemblage of 40,000 men so far from her base as even Merv or Herat. Russia has I think, some 30,000 men in Turkestan, and every single man who goes there takes two years on the road. I really believe that the main object of Russia in trying to get possession of Merv has been to obtain a commercial and military road to the Oxus, with the side view of alarming England, and to create internal disorder in India.

The country to the east of the Oxus is extremely poor. It is possible that, having once gained Merv, some 140 miles from the Oxus, and 400 from the Caspian, with long preparation and with restoration to cultivation of the now desolate districts between Merv

and Herat, Russia might support her army on the road. But, on the other side, everything is ready to her hand; and she now owns the fortresses and the whole country lies bare to her down to the gulf, unless we stop her. Again, it can easily be supposed she woud like to cut off the land communication between Europe and India, by gaining possession of the remaining country not lying in Russian hands. I heard it stated by Russia that any railway between Europe and India ought to pass through Russian territory. They have made a railway to Vladtskaukaz, on the northern slopes of the Caucasus. They certainly surveyed, if they did not actually make, a railway to Tiflis, and last year they were anxious to obtain permission from the Shah to construct a railway to Tabriz and continue it to Teheran; but, on the advice, it may be surmised, of our representatives there, their scheme was rejected. There is no doubt that that would be the easiest route to India, but it would have the disadvantage of being in Russian hands. Russian policy would be to entirely monopolise it for their own purposes. There are various schemes for making a railway through Asia Minor. Some run right through Asia Minor to Van, and the ordinary one goes from some point on the Mediterranean coast to Basrah. This would be for many reasons so unsuitable, that it would be only a politico-military line, and next to useless for commerce. Another line would be from Constantinople through the Tigris Valley and into Persia, and this would, in the present state of affairs, be wholly out of Russian hands. To prevent this by annexing the country before hand, might well be a powerful motive in addition to the wish of getting a fine country when it lies open to them to do so, and obtaining a post on the Southern Sea. It seems to me that the persistence which they show in keeping Kars, of no value to them as a means of defence, evidences the existence of further designs on their part on the Asiatic dominions of Turkey. The Russian Frontier is extremely strong beyond Kars. The fortresses on the Araxes are constructed in the Europeon manner with heavy ordnance and Kars is therefore of no use to them, except as an outpost in Turkish territory. Their only road at present to Turkestan is the long and devious one by Northern Asia. Had they a practicable commercial and military road from the Caspian to the Oxus, immense delay and expense would be avoided. To the east coast of the Caspian there is water carriage all the way to St. Petersburgh by the Volga. In fact, it would be possible to go in a steain launch from London to Krasnovodsk. For want of this road, which the possession of Merv would give them, it takes, as I have said, two seasons to send every soldier required for the garrison to Samarkand. For this mainly they wish to seize Merv. At the same time they would be very glad to see Herat in Persian hands, to be used as a lever for creating such complications as characterized our Afghan war of 1839-42. They hardly conceal their wish that we should occupy Afghanistan, sharing the belief of a numerous party at home and a few in India, that we should thereby have a job that would keep us thoroughly employed. In this view, I do not concur; for I believe that the danger and difficulty of English occupation are enormously over-estimated in every point of view, military and political

VII.

**VERTICAL FIRE OF MUSKETRY, AND ITS POSSIBLE
EMPLOYMENT IN ATTACK.**

The increased destructive effect of rifled musketry fire due to a flat trajectory has been one of the most simple and best realised lessons of the late war. In our own service the greatest attention is paid to *individual* training in rifle shooting and in this respect probably we could compare favourably with any army. Field firing has also given us many valuable data in *collective* shooting which has a much greater influence on tactics.

Perhaps the most remarkable fact that has been elicited by trial, is the very small difference in value between aimed and unaimed fire; this difference being in some trials only $\frac{1}{2}$ per cent., *i. e.*, the value of unaimed fire being 2 per cent. against certain dummy enemies; the value at aiming ranges rose only to $2\frac{1}{2}$ per cent. This fact is borne out by the results of the Turkish peasant-infantry fire in the late war and it seems doubtful whether our excellent *individual* shooting will give us such an advantage on service as we have been led to expect and when we consider the ranges at which infantry fire now becomes effective this ceases to be a subject of astonishment. What sportsman among us would dream of bringing down a beast at even 700 yards? The range precludes aiming and the object becomes to cover a certain area with a sweeping fire of musketry bullets in a plane as nearly as possible parallel to the ground and as close to it as the flattest possible trajectory will enable us to bring it.

In seeking and obtaining this advantage it appears that we have overlooked a method of fire which will in future be a valuable adjunct to the attack of infantry on an enemy in position.

The greatest efforts have been made to formulate some system of covering parties to support the sorely tried infantry parties actually advancing to the attack and which have been compared to columns of assault.

Artillery here finds one of its most useful functions and its value being moral cannot be estimated by shrapnel hits (as has been attempted) nor can infantry supplant it in effect, still it seems probable that infantry can supplement artillery even at long ranges. This can be done by *vertical fire of infantry*.

Experiments are as yet wanting, but it seems that a Martini Peabody held at 32° elevation will give us a range of 3,000 yards; it would therefore seem possible to employ a quadrant of some sort with

a plumb-bob and a scale graduated in yards to give the ranges corresponding with certain angles of elevation.

In this way the point to be assaulted would be submitted to a *vertical shower of bullets from the covering party* in addition to the *horizontal fire of the columns of assault* and a large material advantage would be added to the existing moral advantage of the assault.

The defence could of course employ the same means, but without the same effect the object being uncertain, moving, and men on their legs offering a smaller mark to vertical fire than men lying down, for the defence who would lie down in shelter trenches to protect themselves from the *horizontal fire* of the columns of assault would thereby expose their whole length to the *vertical fire* of the distant covering parties.

The principle here enunciated may be capable of extension to the supports who might possibly be able to continue giving the support of their fire to the advance *firing vertically* when it would be impossible for them to *fire horizontally* when masked by the advance. A man advances more confidently when allowed to make a noise with his gun than in depressing silence and if he could be taught to produce effect as well as noise a double advantage would be gained.

As vertical fire of small arms would resemble mortar fire it would be equally unnecessary in each case that the object should be seen, the range and direction being similarly given in cases when the enemy may be hidden from view.

These remarks are the merest suggestions, it would seem advisable to try in practice a few rounds with a quadrant, when reliable data might be obtained. The subject is attracting some attention.

M. MARTIN, LIEUT., R. E.

UNITED SERVICE INSTITUTION OF INDIA.

The Council give notice that Life members to the Institution will be admitted on the following terms:—

“ Old Members ” Rs. 45 + Current year's Subscription = Rs. 50
“ New Members ” Rs. 50 + Entrance Donation = Rs. 55

Every Gazetted Government Officer is entitled to become a Member, or Life Member, on payment of the regulated Sums.

The Council give notice that a Gold Medal will be presented to the Contributor of the best Essay or Lecture, published in the Institution Journal, between 1st June 1878 and 31st May 1879.

NOTICE.—Back Numbers of the Journal can be obtained at Re. 1 per copy, on application to the Secretary.

By order of Council,

A. D. ANDERSON, CAPT., R.A.,
Secretary United Service Institution of India.

SIMLA.

1st December 1878. }

N O T I C E .

MEMBERS of the Institution who have not already done so, are earnestly requested to pay their arrears of donation and subscription either to the Corresponding Member at their station, or direct to the Secretary at Simla.

Officers who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the same time as they express a wish to join the Institution, and also to inform the Secretary whether their subscription is intended to be for the current year, which ends on the 31st May 1879.

Members can pay their subscription to the Alliance Bank, Simla, if more convenient, and the Bank will grant receipts for any money sent.

The entrance fee is 5 rupees and the annual subscription 5 rupees.

Members on changing their addresses are particularly requested to notify the change to the Secretary, in order that delay in forwarding the Journals may be avoided as much as possible.

The address book is corrected up to date from the Army Lists, but mistakes are occasionally unavoidable, unless members themselves promptly notify their change of residence.

Members proceeding to England on leave, who wish the Journal to be forwarded to them while absent from India, should inform the Secretary, and send stamps for the overland postage by Brindisi or Southampton.

When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

Members on return from furlough can obtain the numbers of the Journal that have been published during their absence, by paying the subscription for that period, and all members on returning to India should inform the Secretary of the fact at once.

The Secretary will be happy to send an Index to volumes I, II, III, IV, V and VI to any member wishing for the same.

A. D. ANDERSON, CAPT., R.A.,
Secretary.

ORIGINAL PAPERS.

I.

"RACE AS MODIFIED BY CLIMATE WITH SPECIAL REFERENCE TO THE EUROPEAN SOLDIER IN INDIA.

READ BY SURGEON GENERAL J. H. KER INNES, F.R.C.S., C.B., ON 3RD SEPTEMBER 1878.

His Excellency General Sir Fred. Paul Haines, G. C. B. in the Chair.

In this bustling world of ours we ever find ourselves in a crowd where the stronger either by force of mind or of muscle elbows his way through the more passive units, each one of whom has alike set before him some goal real or imaginary at which with varying will all seem bent on reaching. Such a struggle much resembles what is called human progress and I am about to ask you to consider with me to day in the first place by what conditions our advance is restrained and governed, and presently how we may apply to the special circumstances of our alien army in India the knowledge thus gained.

One of the most primitive conditions of living forms consists of a simple cell or stomach surrounded by hairs which have no other function than by their constant undulatory motion in the water to waft into it its natural food: so simple indeed is this form that we see it also exemplified in the vegetable kingdom, notably among those plants call'd fly-catchers where the fly entrapped by similar cilia is then dissolved by the vegetable juices in a sort of stomach and is appropriated by the plant. The roadsides of Simla at the present moment afford at least one variety of this vegetable and even on the roads themselves it might not be difficult to find some even amongst the more humanized animals whose systems would appear to be constructed on an equally simple plan,

As the first form of life is a simple stomach cell capable, by buds of infinite propagation, so we go on with increased complexity of form through fishes, reptiles, birds, and beasts up to man who himself passes through all these stages in his earliest and foetal state* the mark of their origin being left on the bodily form of many of the superior race in after life, in one man you distinctly trace the fish, in another the bird or other animal, and some are reptiles all over.

In the Geological Strata, in the graves of the earliest races a clear progress is thus traced from humble to superior types and there seems

* Bray, anthropology.

reason to believe that similar changes to those which in prehistoric times have led to the extinction of species and to their replacement by others better suited to surrounding conditions—though perhaps in a less degree are still at work, but this much at least seems certain, that the brain developement and therefore the mental power, *savoir faire*, if you will, of the whole animal creation has under-gone a vast expansion within more recent periods, in short that creation at large has become more intelligent. In the fauna of the lower eocene the brain proportion was minute to a degree and Mr. Marsh in figuring some of these early forms helps to show us how very much the size of the brain has increased with the progressive advancement of the species*; already the brain of civilized man is larger by nearly 30 per cent. than that of the savage.

Most of us here are familiar with the course of deductive reasoning by which, while making language their fulcrum, German philologists led by Max Müller have derived from a common stock the two dominant divisions of human kind and we need not therefore do more than touch upon them now : if the Aryan theory be true, and there is very much to give it probability, we must recognize a great branching off from a still more primitive stock in Central Asia of the Aryan or Indo-European and the Syro-Arabian or Shemetic race, contrasting one with the other in very radical differences in the structure of the language transmitted by each, in a strong individuality and in the manner of their after spread, but each possessed of a vitality which destined both to become the great conquerors and civilizers of the fairest portions of the globe. The migrations of the first of these sweeping before its advance the ruder barbarisms of the north and perhaps owing their successes as much to the justice and tolerance which they displayed as to the force of their arms, and the second making its home in Asia Minor where on the shores of the Mediterranean it found a congenial coast line, a favouring climate and those special natural conditions which have ever been factors in determining the history of a race.

Let us for a while examine what the most marked amongst those factors were.

The word *aryan*, derived as it is from the Sanscrit root *aryaa*, (*Excellent,*) affords strong evidence that the country to which it was applied and the people inhabiting its soil had become by a species of natural selection grandly superior to the tribes who surrounded them, indeed there was probably a still more marked difference between these and

* Agreeing with the *Coryphodon* in the possession of five toes is the *Dinoceras* with the skull about a yard long and itself nearly the size of an Elephant yet with a brain so small that it could be drawn through the neural canals of most of the vertebrae. In the *Coryphodon* a similar deficiency of brain exists and in the specimen figured while the skull is about the size of a small sheep the brain is less than $1\frac{1}{4}$ inch long, indeed a marked characteristic of all the earliest amongst the mammal forms is the minute size of the brain. Marsh. American Journal of science and arts Vol. 14, page 77. See also M. Gaudry. *Les enchainments du monde animal dans les temps Géologiques*. Paris 1878.

their neighbours than we find existing at the present day between the older aryan conquerors of Hindostan and the aboriginal tribes of Central India. The shemites have their early type in Assyrian sculptures and what a noble type it is! if only as preserved the Arab physionomy of the present day.

Baron Larrey in speaking of the Arabs tells us how complex are the convolutions of the brain, how tough and physically dense is the nerve fibre. How sight and hearing, taste and smell are sublimed to an almost incredible excellence and how their physical perfectability is far from being equalled by the nations of the north: he eulogises their skulls and adds that experience has proved to him how proportionably large is their intellectual calibre to this higher developement of material organization.†

Here then in each of these races and in their conquering off-shoots we begin with a high Physiological type. In the aryan conquest mere brute force succumbed to more disciplined combination, what wonder then that by the mettle of the one the tide of conquest surged over Europe and by the germinal power of the other the whole of the mediterranean littoral succumbed to Phœnician genius or to Jewish enterprize, a nationality from whose branches, rooting themselves as they spread, the Pelasgi and the Heracleides grew and the arts of Carthage, of Etruria, of Greece and of Rome were born.

We naturally desire to know what these conquering races were like and to observe what correspondence we may find in the types which sculpture has handed down to us from antiquity with those which characterize other nations who have successfully pursued similar careers. There is one of these which cannot fail to strike us, I mean that kind of bullheadedness which is so remarkable in those Assyrian and Roman figures which represent their most remarkable warriors: great breadth behind the ears arising from the large capacity of the spinal column where it joins the head for the lodgment of a wide brain root, and a full developement of the animal instincts. I shall make my meaning better understood if we call to mind the opposite condition so often depicted by the old masters in saints and anchorites, notably by Jose Ribera, certain heads from the sides of which inaterial seems to have been scooped out to form the ears which have been placed in front of the hollow; heads, which indicate a low state of animal vitality so often associated with spiritual ecstasy. The exact opposite of such a head is the one we most usually find in persons of vigorous frame who are long lived, it is a developement which, to be a healthy one, requires a proportionate expansion and balance in the higher faculties, it is in the brain root itself that all the nerves of sense take their rise and there can be no doubt that its proportions must largely determine the amount both of physical and mental vigour. We must remember too that there

* Prilchard Vol. II.

is a close connexion between basic width and the reproductive power an essential qualification in successful colonization.

It is probable that the intermarriage of the conquering races with the conquered during their gradual advance is always of a very limited character and that among all peoples the issue of such unions has been regarded with a greater or less degree of disfavour, indeed there are usually antipathies between races so circumstanced which seem specially implanted by a natural law and which are unfavourable to miscegenation. Color appears to be one of these natural barriers, and this was, I think, illustrated during the Indian mutiny, for among all the horrible tales of native profligacy, which a sense of wrong conjured up while it was in progress, I believe that there is scarcely one of them which has not been very completely disproved.

This separatism between the superior and the subject race to which I have referred was equally exemplified under the Romans where so great was the sway of the principle, that intensified under the Empire the plebeian was forbidden to intermarry with the patrician, it was only on the concession of the Lex Conubii, that the former began to feel that a mutual nationality had been conceded to them.

Races which have the same ancestral types, such as those that now inhabit Europe may be crossed with all advantage, but mongrels only result, usually inferior to either original, when distinct races are crossed. Darwin tells us that the first meeting of distinct and separate people generates disease, and we know that amongst Eurasians in this country how seldom it is that a high European standard is maintained but it is nevertheless well ascertained that the mortality of the race contrasts very favorably with that of the unmixed blood, although subjected to the same climatic conditions, and the facts adduced by Mr. Tait in the Statistical Journal would show that this race is likely to maintain itself in India. We have the authority of Twining for asserting that in no instance has the unmixed European carried on the race for three successive generations in this country, indeed the results of Rattray's more recent observation on the effects of tropical heat on 48 young naval cadets during a voyage in which there were four successive changes of climate, go to prove the degeneracy which invariably results from such exposure ; they all increased unduly in height at the expense of stamina.

Mr. Riddell graphically described to us very recently how the untamable red skin of America, who has been said to be at once endowed with the incapacity of infancy and the unliancy of old age, uniting the opposite poles of intellectual life was rapidly disappearing before the advance of the white man, he told us how their ultimate suppression seemed merely a matter of time, indeed this is one of many similar instances noted by Malthus which seems to exhibit the working of a natural law under which humanity is pressing on-ward to new and improved conditions.

Life has been described* as the continuous adjustment of internal relations to external relations, and natural history whether of man or of the inferior animals affords one long narrative of such adaptation. This adjustment is no recent process but has been advancing for many thousand years—it takes very long before any two forces will act unconsciously and automatically together, and the forces which constitute the harmony of the human system are infinite, but once united their divorce is not easily effected. Men grow into what they are by a slow and petrefactive process brought out by natural laws and we may hence realise the basis on which rests the stability of type and of race. I think that it is Froude who reminds us that "the home of the languid Italian was also the home of the sternest race of whom the sternest race retains a record." There is an eloquent and striking passage in one of Emerson's works to which I have no means of present reference in which with a vigorous pencil he sketches the origin of this stern nationality of Englishmen, painting them as the outcome of the energy and adventure of those Norse pirates, of iron frame and toughest fibre, rugged and savage as the wild beasts which their descendants took as the devices for their shields and how, fined as it were by a species of fermentive process and of natural selection, they became in the long process of years the ancestors of a people unmatched in modern time for enterprise, for daring, and for spawning power. But it is perhaps in the Jewish race that we may best realize the basis on which rests this strong principle of heredity. To this, our own day, the Jew everywhere exhibits all the enterprize which was his special characteristic when he was lord of Palestine. Lecky speaks of the Jews as the chief interpreters to the middle ages of Arabian learning, he tells us how they amassed knowledge and stimulated progress, that they were the most skilful physicians, sharing with the Arabs excellence in this science, and that they numbered amongst their tribe some of the most profound philosophers. We know that they partake of every complexion, that they have been spread from early times through all known countries, we find them very commonly amongst the Mahrattas, in the towns of Cochin where their residence appears to have been from very ancient time and where it has recently been asserted they are descended from the merchants sent by King Solomon to trade in spices and precious metals. They are there black and so like the native inhabitants in their complexion that they are with difficulty distinguished from them. At Matacheri a town of Cochin there is a particular colony of Jews who arrived at a later date in that country and are called Jerusalem or white Jews, here as elsewhere they avoid all intermarriage with the surrounding inhabitants.

Under the most unfavorable conditions to healthy development their vitality has asserted itself, they have been forced to live in special and crowded quarters of great cities, they have been pressed to supply the wants of their oppressors when their own wants were far greater

* Bray-anthropology.

than the wants of those who oppressed them, they have been often deprived of the highest services which the healing science gave to their more fortunate and favored compeers ; in the midst of all these adversities and depredations, the Jews have continued to live and what is more remarkable have continued to live exhibiting a healthier life and a longer life than others among whom they may have been cast.

It seems probable that the Jews everywhere owe much of the preservation of their distinct type to the precepts of their religion which rigorously discourages marriage without its pale but which at the same time is ever ready to garner to itself converts from the nations amongst whom they dwelt, thus constituting a fold into which others might come but from which none strayed. A system which contained within itself the germs of an universal religion and which ever placed before its people the highest standard of right doing, and to this cause also may be attributed the great freedom from disease enjoyed by this people and the patriarchal age which is commonly attained by them ; a careful collection of statistics in Germany for ten years by Dr. Mayer goes to prove that their average duration of life is eleven years greater than that of the Germans amongst whom they live. Now the average duration of human life in Prussia is 31.18 years, while in England it is 36.92, the Jews life should therefore in England be nearly 5 years better than that of the average Englishman.

The nature of the food which we habitually take must be considered in its effects rather in the light of a personal accident than as leaving its mark on a tribe or a people. The Esquimaux lives on animal fat and nutriment rich in carbon because he needs these elements to maintain his temperature in the cold regions which he inhabits. Our daily food must be like our daily fire it requires adjustment to surrounding conditions, we can scarcely imagine the Hindoo with his tamer pulse and more placid temperament making these inflammatory materials his habitual diet, it is a neglect of this adjustment which is one of the most fruitful sources of disease. All these are very obvious conclusions, and whatever our individual leanings may be, whether towards a course of green food, or of animal flesh, the dental configuration of the race has stamped it as carnivorous, and decided that point for us as conclusively as did Cuvier for the gentleman-in-black when he unexpectedly made his appearance. "Horns and hoofs," said Cuvier, "graminiverous, he can't eat me !"

A redundancy of animal food even in the case of individuals habitually carnivorous will, by throwing difficulties in the way of the stomach, grievously affect the temper, and we perceive therefore the truth which lay at the bottom of the practice of Keane the great actor, who said that he always ate beef when he was about to play a tyrant, pork when he was to represent a murderer, and boiled mutton when he personified a lover.

The composition of our water-supply is another important feature in our well being—we all know how the French savans when enquiring

after water for the supply of Paris, found that more conscripts are rejected in soft water districts, on account of imperfect development and stunted growth than in the hard, and how they concluded that calcareous matter in water is essential to the formation of tissues. In England, it appears that the death-rate is influenced by the water-supply not only as to its sufficiency and the amount of organic matter contained in it, but also as to its relative hardness. Glasgow and Manchester are supplied with soft waters and have high death rates ; it may be said that in towns supplied with water of more than 10 degrees of hardness, the average mortality is about 22 per 1000, while in those supplied with softer water it is about 26 per 1000.* We must remember that this difference of 4 per 1000 although not great in itself represents a vastly greater amount of merely defective health. One of our most prevalent ailments here in Simla during the rainy season is without doubt connected, however distantly, with the softness of the water which is for the most part only rain-fall unfiltered through chalk-bearing strata.

Amongst all the modifying influences which we have hitherto been reviewing, we have not touched upon some which are as real but of a more subtle character. None of us can fail to have been struck with the manner in which the religions of races are moulded by the conditions under which they are nurtured. What an exquisite anthropomorphism lives in the pages of Homer, who in reading these can fail to admire the purity with which all human attributes and even purely human appetites are endowed as Godlike and Godgiven symbols ; the reverence which he instills for all those human ties which underlie all the foundation of human relationship ; for human strength and for human beauty. The life of the Greeks was every where under the open heaven, and their religion caught its radiance, surrounded with natural beauty, imagination filled the long vista of the distant future with an Elysium which only reflected the realism of the present. But in the more rigorous climate of the North a gloomier creed was bred, one in which the future should compensate for the ills with which life was burthened, where departed ghosts feasted in the halls of Odin or did battle with phantoms in the murky air gloomy and gaunt as themselves.

Not the least curious amongst the more recondite principles which must more or less affect us all are the changes in the force and direction of Magnetic currents, attention has been directed by Dr. Bird in his Physiological Essays to the increase of these which is taking place in America, and their corresponding decrease in Europe and Asia, and when from the general we descend into particulars we find that at Toronto the total force in the dip inclination of the Magnetic needle has been increasing annually by 1° and diminishing in London by 2·7, this shows says Dr. Bird, that a benefit or a loss is travelling westward, " can it be true "he says," as the Yankees continually tell us that Europe is growing

* City press.

old, that having borne the burthen of a high civilization for thousands of years she is transferring it to the back of the unexhausted energies of America." It certainly admits of question as to whether Europeans are improving in America as to whether there is a benefit or a loss. In America, the nervous system greatly predominates, and perhaps Nathaniel Hawthorne is right in attributing this circumstance to the dry atmosphere and vicious habits of life but the fact remains to whatever cause we ascribe it that the American is assuming a type of his own.

As in America so in Australia is the climate and surroundings working out a change in the race: what they are likely to become is thus figured by one of their own most lively writers.

The inhabitants of this Republic are easily described. The soil is for the most part deficient in lime, hence their bones will be long and soft. The boys will be tall and slender—like cornstalks. It will be rare to find girls with white and sound teeth. A small pelvis is the natural result of small bones, and a small pelvis means a sickly mother and stunted children. Bad teeth mean bad digestion, and bad digestion means melancholy. The Australians will be a fretful, clever, perverse, irritable race. The climate breeds a desire for out-of-door exercise. Men will transact their business under verandahs, and make appointments at the corners of streets. The evening stroll will be an institution. Fashion and wealth will seek to display themselves out of doors. Hence domesticity will be put away. The "hearth" of the Northerner, the "fireside" of Burns' Cotter, will be unknown. The boys, brought up outside their homes' four walls, will easily learn to roam, and as they conquer difficulties for themselves will learn to care little for their parents. The Australasians will be selfish, self-reliant, ready in resources, prone to wander, caring little for home ties. Mercenary marriage will be frequent, and the hotel system of America will be much favoured. The Australasians will be large meat eaters. The present custom of drinking alcohol to excess—favoured alike by dietary scale and by carnivorous practices—will continue. All carnivora are rash, gloomy, given to violences. Vegetarians live at a lower level of health, but are calmer and happier. Red Radicals are for the most part meat eaters. A vegetarian—Shelly *exceptio quæ probat regulum*—was a Conservative, Fish eaters are invariably moderate Whigs. The Australasians will be content with nothing short of a turbulent democracy.

For their faces. The sun beating on the face closes the eyes, puckers the cheeks, and contracts the muscles of the orbit. Our children will have deep-set eyes with overhanging brows; the lower eyelid will not melt into the cheek, but will stand out *en profile*, clear and well defined. This, though it may add to character, takes away from beauty. There will be necessarily a strong development of the line leading from nostril to mouth. The custom of meat-eating will square the jaw and render the hair coarse but plentiful. The Australasian will be a squareheaded, masterful man, with full temples, plenty of

beard, a keen eye, a strong and yet sensual mouth. His teeth will be bad, and his lungs good. He will suffer from liver disease, and become prematurely bald ; average duration of life in the unmarried, fifty-nine ; in the married, sixty-five and a decimal.

The conclusion of all this is therefore, that in another hundred years the average Australasian will be a tall coarse, strong-jawed, greedy, pushing, talented man, excelling in swimming and horsemanship. His religion will be a form of Presbyterianism ; his national policy a Democracy tempered by the rate of exchange. His wife will be a thin, narrow woman, very fond of dress and idleness, caring little for her children, but without sufficient brain power to sin with zest. In five hundred years—unless recruited from foreign nations—the breed will be wholly extinct ; but in that five hundred years it will have changed the face of nature, and swallowed up all our contemporary civilisation.

It is a noteworthy fact that low stature and great capacity of chest are common to all the inhabitants of high plateaux from the Andes to the Himalaya and equally that the open air life led by the inhabitants of highlands or other causes connected with the elevation appear to be inimical to Phthisis; much stress has been laid on this circumstance by Dr. Hermann Weber who has shown how in the true Alpine region in Dauphine, in Peru, in Mexico and in Germany, phthisis is decidedly averted or prevented by them, it has been commonly believed that the number of respirations was augmented in the inhabitants of high lands ; Jourdonet has pronounced this to be erroneous and his conclusions are fully borne out by the results of those observations which for some years we conducted amongst the soldiers at our hill stations.

Professor Parkes says that a phthisical sanatorium at an altitude of 10,000 feet would be likely to cure the disease in many cases if taken early and suggests that when convalescent the men might be kept on the lower hill stations until perfectly strong. We unquestionably send home year by year to certain death many men, who have contracted the germs of phthisical disease in the plains of India, but these so commonly arise from and have so much interdependence on hepatic derangements, that the favorable results of such an experiment are I think more than doubtful.

Gentlemen, if I have dwelt somewhat long on the more general bearings of the subject before us, it has only been that I might render the more easy to you its special application. I have already referred to the Mutiny of 1857-58, it was one of those cataclysms which served with all its terrible accompaniments at least to wake us up from a slothful lethargy, it was one of the consequences of the Mutiny, taken in conjunction with the Crimean Campaign, which immediately preceded it, that the home Government first awoke to a sense of the real responsibilities which were involved in maintaining in their Eastern possessions an European army outnumbering the home force and that of all the other colonies put together. It was in 58 that the mortuary

Statistics of the British army became first a subject of interested public notice. The sanitary condition of the army at home was at that time most unsatisfactory, the representations of medical officers had been systematically ignored and the disasters and mismanagement of the Crimean war had every where forced unwilling attention to a subject which it was impossible longer to blink.

At that date, while the mortality of the population of England and Wales at army ages ranged at 9·2, that of the Indian army of the three Presidencies for a series of years had stood at 62·45 per 1000, of deaths in hospital from disease alone. A sum which was augmented by 1·175 by deaths out of hospital. The occurrence of this large addition is explained mainly by the fact that nearly the whole of the period was one of active and trying warfare; and here it may not be amiss to note the wholly disproportionate number of casualties from wounds in war to the enormous figures which all campaigns, to which the latest is no exception, yield from disease. With regard to the above quoted figures Dr. Norman Chevers remarked in '54, how consolatory it was to observe that the average of the preceding eight years displayed a rate of mortality both in and out of hospital considerably below the standard of the Bengal hospital mortality of the last 46 years (69·40) and within the rate (63·4) prevailing, during a time of peace among H. M.'s forces serving in stations at large within the tropics.

Time will not permit of any detailed comparison as to the proportion in which such rates were distributed between the three Presidencies. The difference of death rate is not a large one although the causes of disease widely differ. In Bengal we find more diseases that kill outright, in Madras a larger invaliding ratio. What chiefly now concerns us is a comparison between these enormous rates, before the sanitation of the European soldier in this country had been effectively looked to, and the table I hold in my hand at the present time (vide appendix) exhibits broadly the results of these. In 1858 as a result of the exposure of our soldiers and the consequent deaths from wounds and disease it amounted to 111·80 per mille. The invaliding was only 43·59 per mille, the two together show the extreme rates 154·66 per mille, and this may I think be assumed as a fair estimate of the probable cost of life and efficiency under the occurrence of any future Indian campaign on a large scale with corresponding conditions. The improved circumstances of our troops of late years have been due to the larger proportion quartered in the hills, to their better housing and dieting, advantages which we must largely relinquish in the field.

These figures I cannot but consider as most satisfactory, mortality from all causes including notably that from cholera has been steadily decreasing while the invaliding of the last five years shows an excess of 5·53 per 1000, only over the five years immediately following the Mutiny, this within the past 3 years has averaged 53·04 per 1000. The year which has just closed shows a lower rate of mortality among our European troops than any year since we have

occupied the country, while the amount of invaliding has at the same time fallen much below the average of the five years which immediately proceeded the running of the troopships. Now, before we had a regular troop service the invalids sent home were chiefly worn out men with one foot in the grave and the other raising their coffinlid, since that date the great bulk of them are men with plenty of work left in them who for the most part are only sent home for change of climate. In the same manner the total loss from death and invaliding combined, shows the lowest figure which we have yet attained. Now these results are undeniably satisfactory and they sufficiently indicate how much the precepts of the preventive medicine have effected. Our death rate has pointed to 11·50 per mille from all causes, while the last 5 years average death from all cases including cholera 13·20 only, may be contrasted with the home rate for the same period of 9·70. Allowance must however be made for the fortunate circumstances of the absence of any wide spread cholera epidemic although we may derive consolation from the consideration that it is the first five years without one, since the appearance of the disease amongst our army in India.

We should however be wrong to encourage the anticipation that any very material reduction on the figures which we have just reviewed is to be expected : morbid causes are of such wide spread prevalence in India that intratropical life can never possess an equivalent value with that which is extra tropical, and what applies to the European applies only in a less degree to the native, with him we have to deal with physiological conditions already adjusted to the climate, but in the case of the European with a state of physical inaptitude and continual effort at accomodating itself to alien circumstances thereby inducing degeneration and decay, this antagonism of condition is further illustrated by contrasting the health tables of the European and of the native force which show larger rates for the former during the hotter months and the highest rates of sickness and mortality of the latter in the cold ones. We therefore may infer that as high a death rate must result amongst any contingent of native troops sent to serve permanently in England as we find now amongst British troops who are sent to India

If we are to expect a still advancing improvement in the health of our European force in India we can only look for it by giving a fresh direction to our efforts. We shall clearly not advance by making our barracks and their surroundings more palatial than they are, indeed we owe anything but a debt of gratitude to the mistaken philanthropy which by sinking vast sums of money on sites, capable of improvement only up to a certain point, have added fresh difficulties to the possibilities of abandoning them, but we may hope for improvement by more generally applying to the soldier those plain lessons which physiology teaches, and in doing this we must take the materials which we have ready to hand. We may perhaps say of our army, as was once said of the Duke of Condé, that it would be a very fine army indeed when it came of age. Our soldiers are young and we have already shown that very hot

climates do not favor the manly development of youths, but in this respect we are improving. Youths in a hot climate will always show a large amount of inefficiency, more perhaps than their seniors but at the same time here as elsewhere their death rate will compare favorably with older soldiers. Deaths from enteric fever amongst men under 25 years of age have for very many years past shown a constant quantity, it is a mistake to suppose that they have increased, but then when this formidable disease, which appears to be specially an accompaniment of acclimatization, disappears from our Mortuary lists its place is taken by others more various but every bit as formidable which still sound the knell of death and we must always bear in mind that although the value of life in home climates descends year by year in a steadily declining gradient, that this decline is proportionably far more rapid in India. At 20 the difference between the two countries is not very marked. At 30 it is doubled, between 40 and 50 nearly quadrupled although there is reason to believe that this extreme ratio is in part at least attributable to the seeds of disease which a too early arrival in this country has sown. On this subject, and in conjunction with my very able Secretary Dr. Marston I am now engaged in collecting data which will I think prove of much value, nor is it possible to rate too highly those beautifully arranged tables which throw so clear a light on the condition of our army elaborated by Dr. Brydon which alone must rank him amongst the first medical statitians of the age. The first among these needful improvements points to an increase of the number of our troops quartered in hill stations, we are as a nation an intensely conservative race and I cannot believe that our practical recognition of the vast strategic changes which our railway system has introduced has been in any measure an adequate one, while day by day almost I may say hour by hour under an altered system of enlistment we are pouring into the country fresh drafts of soldiers demonstrably composed of the class who crowd our hospitals. We know that the more nearly we approximate our climatic conditions to those of the home country the more surely may we predict not only that our soldiers will receive a longer lease of life but that we shall be enabled to retrench our Medical Establishments our transport service and in very many other directions to effect a saving to the state, and as the efficiency of a soldier in time of war is now in direct proportion to his intelligence and power of taking care of himself, so would these qualities be proportionately reduced not only by making him the builder of his own barrack, but by encouraging him in the practice of trades which it is impossible he should properly exercise under the depressing conditions of existence in the plains.

"Regular bodily *pleasurable* exercise "says Professor Parkes" has been said to be worth a host of physicians for preserving military health, and occupation without distress or fatigue is happiness: The Philosopher can make no more of it, and every idle hour is an hour of irksomeness and every idle man is and must be a vicious one and to a certain extent an unhealthy one."

This remark applies to soldiers of every period of service for we have already shown that we may have degeneracy and exhaustion but that there is no such thing as real acclimatization in India. But although this is the case, the more gradual the accommodation of the young soldier to the alien conditions he has to face the better, instead therefore of sending to such few hill climates as we can give to our troops the older soldier, whose habits have already accommodated themselves and who is usually sorry to exchange them for the mountains, it is the young soldier whom it should be our aim to introduce to India under conditions which offer no sudden contrast to those natural to him; how different is this system from that which is now in practice I need not say. With young soldiers quartered in the hills we may fairly expect that their standard of health will differ but little from that of the home country. Enteric fever, which next to cholera, is the chief of all our lethal causes we know can in some degree be kept at bay, but with the abnormal conditions to be encountered in the Himalaya we cannot expect altogether such favourable results with older soldiers, we have at altitudes of 8,000 feet one quarter less oxygen in the air, we have altogether a lighter atmosphere, the heart is more irritable at these altitudes. Then we have a long relaxing rainy season which washes us out mentally and physically, in short the conditions adverse to European life are such that it is clearly not a country which we should hope to succeed in colonizing.

We have not as yet attained the power, though by and bye, aided by physiology, we may, of selecting our recruits from what experience has proved to us to be the material most fitted to encounter the wear and tear of its climate. We know that the locomotive and other animal functions are more active in persons of a sanguine temperament than in those of a lymphatic one while in sanguine temperaments the red globules are more numerous than in lymphatic ones. Le Canu has shown that the blood of women contains more water than that of men and fewer red globules, but the statistics of life as between the two sexes in India are so vitiated by the differences of the conditions under which they severally live as to afford no safe data for comparison.

Then comes the question drink and food, how far in the case of the European soldier are these wisely adjusted. There seems now to be a consensus of opinion every where that the spirit ration as now given is an unmitigated evil. That it is grateful in the dead level life of the plains is quite conceivable but it is unquestionable that more than half of our deaths from sunstroke are directly attributable to it, a soldier would probably urge that life would scarcely be worth living if he were deprived of the stimulant but this is a condition bred of custom which our whole system in dealing with the recruit is calculated to foster. The real secret of adapting an alien constitution to climatic conditions foreign to it is to follow and to imitate as closely as may be the rules of life which have been adopted by the native who thrives in it. The

tribes of Hindustan are perhaps less addicted to alcoholic excess than the inhabitants of any other portion of the globe, yet they have ready to hand their toddy, their mowa and their rice. Surely their habitual abstinence is one of those inherited instincts through which the race has learnt to resist local influences under which they would else have succumbed.

I would however on no account be understood to advocate total abstinence from Alcohol whatever be its form in this climate, we may do without it in colder latitudes indeed are often the better for its habitual disuse, but in India the heart's action is apt to become temporarily so enfeebled from excessive surface secretion after persistent exertion as well as from other depressing causes that in moderation its use often becomes desirable—but then one must not administer it at stated hours, often on an empty stomach, but must adapt these to the requirements of the animal functions—not accustoming them to look for it so to speak as a necessary and habitual prop but only as a means of temporary support—tea, cocoa, coffee and tobacco are all of them conservators of force, the habitual use of which is far less harmful than spirits and we should do well under all conditions at least of active service to supplement in part the ration of spirit as now administered by some of these.

For a long time past beer has been supplied to the Soldier in the hope that he would abandon for it the more fiery charms of its rival. Now I am one of the last people who would wish to rob any one of his beer, it is a beverage very sacred to the Englishman, one to which all sorts of virtues real and imaginary have been attributed and one is reminded of the manner in which an electioneering spokesman in the interest of the malsters appraised its merits and balanced them with those of wine. Beer and wine said he met at Waterloo, wine red with fury, boiling over with enthusiasm, mad with audacity rose there against a hill where stood a wall of men, the sons of beer. You have read history, Beer gained the day.—But beer although a sleepier mistress especially contains within itself, apart from its alcoholic essence, those hydrocarbons which burnt in the lungs tend to an increase of temperature, and it is therefore a far less suitable beverage for warm climates than is wine—it does not stimulate the nerve power as wine does. Many of us will remember Curran's defence of the pot of porter which he was seen to imbibe just before going into court, that he was endeavouring to muddle his brains down to the level of an Irish Jury.

We are about entering into a new phase in the beer arrangements for our soldiers, we are very properly diminishing the importation of English beer and replacing it by that made in the country, it therefore becomes more than ever important that our hill brewers should be well supervised and that strict Government inspection of breweries should be established here as it is in England: the stupefying effects of some of the hill beers have been a subject of very frequent complaint by our troops,

the truth being that the brewer imagines the more body it has the better will it keep. Now this idea is on all accounts to be discouraged. The German beers have great keeping power and but little intoxicating effect—they are tonic beverages containing sugar in small proportion—are therefore less heating, but they are rich in bitter extractive matter, their keeping power is arrived at by making the fermentive process a very slow one. This is the description of beer best suited for Indian consumption. Dr. Henderson of Rawal Pindee suggests the feasibility of using other vegetable bitters besides hops in brewing our Indian beers and in some correspondence which has reached me lately he notes how English beer was made without hops until 1524, when the hop was introduced from Flanders, but it met with violent opposition and petitions against it were presented to Parliament stigmatizing it as "a wicked weed that would spoil the drink and endanger the people" and the citizens of London protested in a body "against the hops in regard to their taste and against Newcastle Coals in regard to their stench." Dr. Henderson thinks that the Indian hemp (the Hasheish of the Arabs) and which belongs to the same natural order as the hop may be employed with advantage in addition to it, and that the strong prejudice which exists against this agent is ill founded.

Food of all kinds is less required in hot than in more temperate climates, there is lessened muscular action and therefore less of the albuminoid constituents of food are required to supply the waste of the muscles—dietetic variety is on all accounts to be promoted, it is this that so much profits the French Soldier: I fear however that it will be long before we inculcate on our own men the virtues of dandelion or the gastronomic excellencies of sorrel. Large meat eaters require more stimulants than vegetarians, may not the relative sobriety of the French army in Algeria have some connexion with this circumstance? The essentials of personal hygiene in warm climates may be summed up as consisting of habitual moderation and the avoidance of extremes, the good health of the Roman Soldier was due to his temperance, to ample occupation and to constant exercise in martial games—in the absence of these he would scarcely have colonized with the effect he did and we know that our word colony is of Roman and of military origin.

*Sir James Martin points out how the excessive flow of blood to the surface (the consequence of high temperature) may prevent for a time the evils resulting from an excess of the two kinds of food. The Chemical changes; and the evaporation going on in the skin draw the circulation to the surface of the body just as the flame of the lamp draws the oil up the wick, whilst the high temperature lasts, this increased action of a flow to the surface is kept up, it is probable that the action of the heart is thereby enfeebled by the excessive suction of the skin, as we see it frequently is temporarily by the perspiration bath, as soon as the temperature falls the blood ceases to flow in excess through

* Tropical climates p. 41.

the skin ; according to the degree of cold it is almost driven from the surface, it accumulates within and congestions and inflammations are produced : free action on the inner or the outer surface of the body for a time relieves these congestions and enables the circulation to proceed, hence the diarrhoea which so often saves one so circumstanced from the ill effects of a chill—are there none here who freshly arrived from the plains of India can corroborate him in all these particulars ?

Next in importance to the quality and quantity of the food is the time of taking it, the soldier, in garrison at home equally with the class from which he is drawn dines soon after noon ; on arrival in India the same course is persisted in, yet this is the very hour when the heat is greatest when the flow of blood determined to the surface leaves the digestive organs least able to fulfil their functions—a ration of spirit or a quantity of beer is taken to goad them on to a proper sense of their responsibilities and the long afternoon is spent afterwards in a heavy sleep during which the brain becomes engorged to the uttermost, thus rendering impossible any co-ordinate healthy action of the secreting viscera, if the soldier were given his coffee and bread on rising he might partake of an unstimulating meal after morning parade and the evening instead of noonday would offer the *peice-de-resistance* as it does with ninety-nine out of every hundred of his brethren in the tropics who more wisely follow the indications of nature. Briefly then *temperance* and *coolness* must ever be our motto in India—for the maintenance of health a steady temperature of 98°6F. neither more nor less, is required whether in the torrid or the frigid zone and the processes of secretion and of heat production are not only intimately associated, but are inter-dependent one on the other.

Again as to the dress, the skin is an air breathing organ, yet how do we smother it ! how abnormally sensitive do we not make it by confining its transudations. One half, fully one half of our maladies have checked perspiration for their exciting cause and much of this because our dress makes it hyper-sensitive : yet the lightly clad Roman, heated by the exercises of the Campus Martius plunged into the Tibur without detriment to himself. Every square inch of surface possesses upwards of 2,500 pores, placed end to end it has been computed that these little canals would be nearly 28 miles in length, imagine the effect of an obstruction in this conduit ! not only does the impermeability of much of the soldier's dress restrain the excretions which should at once be eliminated but promotes their re-absorption from the surface into the circulation—witness the leather boots, one of our importations from a colder climate and which we insist on using in this ! can any one believe that the atmosphere of a barrack room in the tropics loaded as it is thus, becomes by putrifying animal exuviae can be a health-giving one !

We all know Napoleon's dictum and what an all important part the feet of the soldier play in a campaign and how great are the evils of foot-soreness, the latter arising from the expansion of

the foot under prolonged exercise rendering too small for it the shoe which fitted it at the commencement of a march—if we start with one of large size the foot gets chaffed, unless swathed in the lappen or bandage so universal in the German army. The German says that a bandage can always be made to press more evenly than a stocking which gets frayed : the remedy for this evil is clearly to accustom the soldier to go barefoot as the native does and to be trained to wear the sandal as our sportsmen often do and as some of my friends assure me that they have done on more than one campaign with manifest comfort and advantage.

It is no easy thing at once to reduce to practice the application of many of those principles which I have endeavoured to indicate in this cursory manner. With every desire to recognize their importance, there are barriers to be overcome in giving effect to them. The budget of the Public Works Department has its limits and the department itself has its traditions, a proposal that the soldier should wear sandals instead of his boots may in the nature of things raise a smile, and although we may eventually succeed in weaning him from the immoderate use of alcohol it must be a more gradual process than the weaning of a fractious child, meantime we may rest assured that his welfare is in good hands, but it is nevertheless right that we should steadily keep in view main principles the application of which has already been productive of so much improvement and that each fresh success should only be an incentive to renewed effort. Gentlemen I have already trespassed too long on your indulgence, but I nevertheless would crave one word more.—The essence of all sanitation may be said to be light and sweetness—its precepts are founded on common sense. We have the authority of Vauban for saying that common sense is the best Engineer, yet what should we say if the province of the Engineer in war were usurped by the sister arms of the service ? The precepts of sanitary science have equally with the other a common sense foundation—yet, and I speak as much of our civil as of our military polity I cannot, but observe with regret that there has existed—and though in a less degree, does still exist—a disposition, to supersede the professional element and to encourage the practice of amateur hygiene. It is not that the science must necessarily be a sealed book to the uninitiated but that its students must bring to its interpretation an amount of intelligent and earnest labour of which few are capable who are distracted by other unrelated pursuits—all science is only systemized common sense but it is only when it is properly applied by its professed experts that it can be made to yield to the full the gratifying results of which the past few years of its rule have been so fruitful and some of which I have had the honor of laying before you to-day.

BENGAL COMMAND.

Table of Deaths and Invaliding in the European Forces in this Command from 1858 to 1877, showing the progressive diminution that has taken place, and the effect [intermittent] of Epidemic Cholera in swelling the ratio of mortality.

Years.	Deaths from Cholera.	Ratio per 1000 of Strength to			Total loss by Deaths and Invaliding.	REMARKS.
		Deaths from all other causes.	Total Deaths.	Invaliding.		
1858	9.27	101.80	111.07	43.59	154.66	Mutiny year.
1859	8.67	36.68	45.35	24.80	70.15	Effects of ditto. Malaria Fever prevalent in the East.
1860	12.04	24.73	36.77	44.09	80.86	Northern India free from Fever. Epidemic Fever in East & Sonth.
1861	23.73	22.20	45.93	28.09	74.02	Epidemic of Fever in Northern India.
1862	9.61	18.50	28.11	31.50	59.61	No. and in Central India.
1863	4.09	20.03	24.12	34.97	69.09	Epidemic in Valley of Gauges.
1864	2.55	18.55	21.10	36.75	57.85	Generally healthy year.
1865	3.12	21.12	24.24	46.87	71.11	Epidemic of Fever in Central Provinces.
1866	1.37	18.74	20.11	49.04	69.15	Very unhealthy year except in Valley of Ganges.
1867	13.84	17.11	30.95	47.28	78.23	Troop ships commenced to run, and short service was introduced.
1868	1.81	18.30	20.11	45.49	65.60	Healthy year as regards fever.
1869	16.46	26.43	42.89	53.98	96.87	Very healthy year.
1870	0.64	21.33	21.97	52.50	74.47	Most unhealthy year of all.
1871	0.70	17.04	17.74	46.93	64.67	Fever in Northern India.
1872	10.55	16.94	27.49	40.20	67.69	Healthy year.
1873	0.80	14.30	15.10	40.03	55.13	A good deal of Fever generally over India.
1874	0.18	14.25	14.43	36.19	50.62	Healthy year.
1875	3.68	13.60	17.28	40.32	57.60	do. do.
1876	3.06	12.76	15.82	35.69	51.51	Some cholera, otherwise healthy.
1877	0.43	11.07	11.60	38.86	50.96	do. do.
						Very healthy year generally

ON THE INFLUENCE OF AGE ON MORTALITY.

UNITED KINGDOM.

C O R P S .	ANNUAL RATIO OF DEATHS PER 1000 LIVING, AT THE FOLLOWING AGES.							
	Under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.		
Household Cavalry	...	...	...	6·25	...	7·94	12·05	
Cavalry	...	...	5·64	6·59	4·10	12·28	19·56	
Royal Artillery	...	...	4·72	7·31	3·50	7·74	11·06	35·21
Foot Guards	...	...	1·30	7·34	13·05	11·58	14·60	30·30
Infantry	...	...	2·98	3·88	6·42	8·09	15·77	13·22
Depôt Bde. R. A., Depôts & Bde. Depôts	2·45	6·30	5·61	9·14	24·80	22·01		
Ditto	Ditto	1866-75...	3·69	7·72	11·06	20·39	23·70	24·52
Average of preceding, exclusive of all Depôts	...	...	2·99	4·95	6·53	8·17	14·57	18·86
Ditto	Ditto	1866-75 ...	3·04	5·31	6·51	12·17	17·53	23·95
Civil Male population	{ England & Wales	7·41	8·42	9·21	10·23	11·63	13·55	
	Healthy Dists.	5·83	7·30	7·93	8·36	9·00	9·86	

INDIA.

	Under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and upwards.
	Average strength	Average strength.	Average strength.	Average strength.	Average strength.	Average strength.
Bengal	704	5	11335	141	12100	184
Madras	355	4	3410	38	3223	53
Bombay	145	3	2931	35	3505	40
Total	1204	12	17676	214	18828	277
Ratio of deaths per 1000 of strength, 1876	{ 9·98	12·11	14·71	17·74	19·50	49·01
Ditto, 1866-75	8·28	16·08	19·65	28·31	36·61	56·69

Simla 27th August 1878.

	Ratio per 1000 of Strength to.				
	Deaths from Cholera.	Deaths from all other causes.	Total deaths.	Invaliding.	Total loss by deaths and invaliding.
Average of five years, 1859 to 1863.	11·63	24·43	36·06	32·69	68·75
Average of five years, 1873 to 1877.	1·63	13·20	14·83	38·22	53·04

Rise in the rate of Invaliding of the two periods ... 5·53.

Average Annual mortality per 1000 among troops serving }
in the United Kingdom, 1872 to 1876 ... } 9·70.

J. B. HAMILTON, M.D., Surgeon-Major.

Statistical Officer to Surgeon-General.

B. F.

Sir Fredrick Haines having enquired whether any member present desired to discuss the lecture.

Doctor Cunningham remarked that it seemed to him the practical questions to be considered, were, how far the mortality of the European soldier was due to climate, how far to the action of Government, and how far to the soldier himself. He thought that the statistics quoted by Dr. Innes and more recent information on the subject went to show that the climate could not have that very great influence on the mortality of the British soldier with which it had been credited. As to the question of the mortality being due to the Government, there could be no two opinions that no Government in the world had ever spent more money on its soldiers than the Indian Government. It was only of late years, however, that sanitary improvements had been brought before, and systematically taken up by the Government, and that people had come to understand what sanitation meant, and therefore he was not surprised that the Government of India were no better acquainted with the subject than the people at home were. As to how far the mortality was due to the soldier himself, that like the question of climate, was a difficult question and one upon which he would not offer a decided opinion. He believed, however, that the soldier was, by his habits and way of life, a great source of disease and death to himself, and that any one who could successfully show how his position could be improved would be doing a great deal. Referring to Dr. Innes' remark that sanitary science was a matter for medical men, he thought that while medical men could bring to bear upon sanitation much valuable information, sanitation should be studied and acted upon by everybody. He believed that individual efforts properly directed, would be attended with valuable results, and that while medical men had effected much, non-professional persons, especially engineers, had also done immense good. With some further testimony to the value of sanitation in reducing the death rate, and with a cordial concurrence in the tribute paid by Dr. Innes to Dr. Brydon, Dr. Cunningham concluded.

His Excellency, Sir Fredrick Haines, in returning thanks, said he was sure that the meeting had appreciated the great study and the amount of dry, hard, reading which Dr. Ker-Innes must have undergone in preparing the instructive and amusing lecture, enlivened by flashes of wit and humour with which he had favored them. Nothing could be more satisfactory than the picture he drew of the progress of the health of [the British soldier and sanitation in India. Dr. Innes had alluded to the want of occupation and exercise for the soldier, these were matters which had not been neglected. If we went back 20 or 30 years in the history of the British Soldier, we should find him without reading rooms or anything worth speaking of in that way. He did not mean to say that we had at all approached to perfection : but something had been done, and he trusted that something more would be done. There was one point with regard to the

rate of mortality which he thought worthy of remark : as regards Barracks. When His Excellency first joined the service, the men and officers, (especially the former) lived in hovels. The barracks now for the most part were comfortable and commodious ; some were palatial but what he wished more particularly to say on this point was, that as the medical profession had not always been, as it is now, of the most humane nature, it must be admitted that the regulations under which they acted in former years, were not altogether humane and were very hard on the men, who were expected to serve out their time and were very seldom invalidated. They were equally hard on the officer who was often sent back by the Presidency Board (which was by the custom of the country then the final court) to his regiment although the Doctor who had originally treated his case declared that if the man came back he must die.

With regard to palatial barracks he thought we must admit that those who spent the money on them did so from a just sense of responsibility to the soldier, and also greatly under the pressure of the humane in England, to whom the British soldier owed a debt of infinite gratitude. He did not however think that the military authorities would have gone quite the length they had done in erecting palatial buildings if left to their own instincts, and without pressure from the outside. However there was no longer the same demand for that class of accommodation, and the military authorities were now most anxious to accomodate the largest number possible on the hills without reference to the extreme excellence of accommodation, the object being to accommodate a greater number without accommodating a few admirably. On this point he desired to draw attention to the attitude of a number of individuals Colonel Fitzwygram and General Biddulph amongst them, whose work although it could have but little effect on the mortality of the army, no doubt was of an admirable character, he would ask some of those who had hitherto overlooked the practical philanthropy of these officers to assist their work by some little pecuniary aid each according to his ability. It did not come under the observation of every body, and this was therefore the greater reason for bringing it to notice.

II.

THE TELEPHONE, THE MICROPHONE, AND THE PHONOGRAPH.

PAPER READ BY J. H. LANE, ESQ., 17th SEPTEMBER 1878.

Lieutenant-General Maclagan, in the chair.

Vocal and other sounds can, it has long been known, be conveyed along a wire or string, as in the Toy Telephone, or through a speaking tube, and in various other ways over distances at which they fail to be audible through the medium of the air alone: in such contrivances the molecules of the medium itself are put in actual motion by the sound waves or sonorous vibrations and these are mechanically transmitted.

In 1837 it was first noticed by an American named Page that iron bars very rapidly magnetised and demagnetised gave out musical notes, and six years later De La Rive, of Geneva, improved upon Page's results by substituting for bars stretched wires passing through coils of insulated wires.

The first really successful *electrical* telephone was invented in 1861 by Philip Reiss a teacher in a school near Homburg. With this apparatus he conveyed, with the aid of electricity, variable tones and tunes: his transmitter consisted of a stretched membrane arranged to rapidly make and break the circuit of a sonorous vibration impinging on it: the receiver was an electro-magnet, the armature of which vibrating in accord with the transmitting membrane, caused a resonator to give out a sound corresponding in pitch to that originally communicated to the apparatus at the other end of the line. The rapidity with which such an armature can make and break contacts renders it quite beyond the power of the human ear to separate the signals and according to the number of currents transmitted per second it recognizes the particular pitch of the musical tone produced. The wire connecting the termini is not in this case mechanically set in motion* as in the earlier string telephone, but remains at rest and acts simply as a conductor of the variable voltaic current set up by the rapid completion and interruption of the circuit by the vibrating membrane. Reiss' telephone could only transmit the *pitch* of a sound: it has, however, recently been discovered that the interposition of a drop of water between the platinum points where the circuit is made and broken, was the only thing wanting to render the instrument capable of transmitting human speech.

* To avoid confusion the theory of molecular polarization of electrical conductors is here disregarded.

In 1873, Professor Elisha Gray, of Chicago, succeeded in transmitting music, by means of an electric organ, over 284 miles of wire. Gray accomplished the transmission of *intensity* as well as pitch but failed to convey the modulations of the human voice.

THE BELL TELEPHONE.

It was reserved for Professor A. Graham Bell, of Boston, after working steadily at the problem for five years to produce the first speaking electrical telephone, an instrument which faithfully reproduces any sound the human voice is capable of uttering. He saw that to produce the gradations and inflexions of speech the electric current must be subjected to a continuous rise and fall instead of, as in Reiss' apparatus, to sudden starting and stopping. Noticing the immense disproportion between the mass of the vibrating membrane of the human ear and that of the bones thrown into motion by it he concluded that a highly stretched membrane, having a piece of iron attached to it, could be made to vibrate in the field of a magnet so as to set up in an adjacent coil of insulated wire, induced currents capable of producing articulate sounds from a similar apparatus at the other end of the line; finally the stretched membrane was discarded in favor of a very thin disc of iron.

The perfected Graham Bell telephone (see diagram) consists of a bar magnet usually about $4\frac{1}{2}$ inches long and $\frac{1}{8}$ of an inch in diameter, one pole of which is passed through, and remains nearly flush with the outer surface of, a bobbin or reel about 1 inch in diameter and $\frac{1}{2}$ an inch wide wound with silk covered copper wire (about No. 36 B. W. G.) to a resistance of about 80 British Association Units; a disc of ferrotyp plate about $2\frac{1}{2}$ inches in diameter and about the thickness of an ordinary visiting card is so placed, parallel to the outer surface of the bobbin, as to be as near as possible to, without being liable to contact with, the pole of the magnet, and while tightly clamped round the edge its centre is free to vibrate in unison either with the waves of sound set up when the apparatus is used as a sender, or with the current received from the other end of the line. These essential component parts—the magnet, the coil, and the disc are enclosed in a suitable wooden case at one extremity of which the ends of the wire coil are led out for connection to the line and return wires. Were the bar magnet entirely of steel it would not be capable of rapidly altering its magnetic condition as is essential to admit of its being used as a receiver and therefore about an inch of the bar at one end is made of soft iron which becomes magnetized by induction and the whole, as is required for the transmitter, thus practically forms one magnet.

It will be observed that the iron disc is within the field of this magnet, and therefore (being a magnetic substance) becomes magnetized itself; if it be moved nearer to the magnet, its induced magnetism is increased, and *vice versa*. Now any change in the

intensity of magnetization of a magnetic substance gives rise to induced currents in a neighbouring conductor and when the telephone is spoken into, the generally accepted theory is that the waves of sound cause the disc to vibrate and therefore to change its position in relation to the fixed magnet; these changes of position induce both in the iron disc and in the soft iron pole of the fixed magnet alterations of magnetic condition which alterations in their turn give rise to induced currents in the coil of wire. The ends of this coil being connected by a conductor to the telephone at the distant station every vibration set up at the sending end of the line sends a current through the coil of the distant telephone thus increasing the magnetism of the already magnetized soft iron core which then attracts the armature or disc causing it to vibrate in unison with the transmitter.

Although every detail of construction in the receiver and transmitter of the Bell Telephone is thus precisely similar, their dual functions differs widely. When used as a transmitter of sound the disc, acted on by sonorous vibrations, induces currents from the magneto-electric battery which it, with the magnet and coil of insulated wire composes. When in its turn the same telephone becomes a receiver, the coil and core, forming an electro-magnet, act on the soft iron disc by attraction.

It is stated that M. Navez, a French Lieutenant of Artillery has obtained articulate sounds from a telephone when the disc of iron was replaced by one of copper, glass, wood, cardboard, vulcanised India rubber, gutta percha or paper, the non metallic substances having been coated with copper foil. At first sight this would appear incompatible with the theory that the action of the Bell receiver is due to the attraction of the iron disc by the electro-magnet but the explanation of the apparent contradiction may perhaps be found in the fact that such discs as were used by M. Navez would all be diamagnetic and therefore repelled instead of attracted by the electro-magnet the result in causing audible vibrations being the same.*

To join up Telephones for use it is only necessary to attach the ends of two wires of the necessary length to the binding screws of each telephone: for long distances the circuit as in telegraphy is usually completed through the earth instead of by a second wire.

In talking through a telephone the sender should carefully separate, and accurately pronounce, each syllable; speaking slowly and clearly without forcing the voice. The sounds most distinctly conveyed by telephone are those of the human voice especially singing and whistling, next in order come the cornet, flute, violin, &c.

* The theory of the action of the telephone is however the subject of considerable discussion in scientific circles, and so high an authority as the Comte du Moncel, author of the *Exposé des applications de l'electricité* says "I believe that in the face of the phenomena being discovered every day it would be imprudent to assert that the true cause of these effects is discovered. We have to do with a new element not yet sufficiently investigated and the wisest thing to say is that the theory of the telephone is yet uncertain."

A specific trial was recently made between Dresden and Leipzig to determine whether the sounds are conveyed by electricity or mechanically. It is calculated that sound traverses iron at the rate of three miles per second and the distance being 70 miles which must be multiplied by two to allow for the reply gives 46 seconds whereas the exchange of signals actually occupied only a fraction of a second. It was therefore proved that electricity, which travels at the rate 288,000 miles per second is the medium by which telephonic sounds are communicated.

To render a telephone line of practical use it is of course necessary that there shall be a means of calling the attention of the distant station when it is desired to transmit a communication; this can be done in many ways amongst which the following may be instanced.

Each station being provided with an ordinary electric bell or alarm these are, by a simple switch arrangement kept in circuit *when the line is out of use*. A battery current transmitted from either end causes the alarm at the distant end of the line to sound: on hearing this call the receiver switches out his alarm and intimates through his telephone the fact of his being ready to listen. The telegraph will itself emit a sound audible in any part of an ordinary sized room if from the other end of the line a powerful electro magnetic machine be made to transmit currents along the wire. A similar effect is produced sounding a tuning fork close to one telephone whereby that at the distant station is caused to utter with comparative loudness a similar note. Another contrivance for this purpose is a metal toothed wheel so arranged that by its rotation contact with a battery is rapidly made and broken by a spring pressing against the teeth; this causes the telephone to give out a very audible humming sound.

Over short distances the human voice is able to overcome the noise produced in the wire by signals passing any other wires which may be supported on the same posts but when the telephonic circuit is long it is essential that the wires shall not be within the influence of other wires. This condition shewed itself very clearly in the preliminary rehearsals for a telephonic concert between Tivoli and Rome where it was found that although a special line of wire had been erected, the fact that it was supported *at one point* on a post carrying other wires was fatal to successful working: this difficulty disappeared immediately a separate support was provided for the telephone wire. Again between Clermont and Fontaine de Berger a wire used for military purposes is supported on the same posts as another wire connecting two Meteorological Observatories: both are worked by telephones; the signals on one wire are said to be distinctly audible on the other circuit and that it has even happened that the Observatory has by mistake received a message transmitted on the military line although the two wires are nowhere less than 34 inches apart. The experience of two telephonists at Providence, Rhode Island is thus humorously described by the New York Times.

"Two men were recently experimenting with telephones the wire of which was stretched over the roofs of innumerable buildings and was estimated to be fully 4 miles in length. They relate that on the first evening of their telephonic dissipation they heard men and women singing songs and eloquent clergymen preaching ponderous sermons and that they detected several persons in the act of practising on brass instruments. This sort of thing was repeated every evening while on Sunday morning a perfect deluge of partially conglomerated sermons rolled in upon them. The remarks of thousands of midnight cats were borne to their listening ears; the confidential conversations of hundreds of husbands and wives were whispered through the treacherous telephone; and as the remarks of Mr and Mrs A, were sometimes inextricably entangled with those of Mr and Mrs B, it was impossible to tell from what particular wife came the direful threat. "Oh I'll just let you know" or from what husband in his agony came the cry "Let go my hair."

It is a pity to spoil a good story, but the only portion of the above which is founded on fact is the account of the sounds of music; a telephone concert was, it was afterwards ascertained by advertising, being conducted by means of an adjoining wire. A telephone wire cannot take up the sounds occurring along its route except by induction from an adjacent wire.

The greatest distance over which the telephone has hitherto been practically worked is 250 miles on a land line and 67 miles through a submarine cable: in the latter induction and retardation prevent any great length being worked telephonically.

The telephone is patented in America and England but not on the continent of Europe or in India. The American patentee lets them out at 50 dollars (Rs. 100) per annum for each set of four, two at each end of the line: this is exclusive of the cost of constructing the connecting line. In England the price of telephones is nominally from £ 2 to £ 20 a pair, but the patent rights have been evaded by the sale of component parts of a telephone for ten shillings: legal proceedings are now going on in respect of this. In St. Petersburg telephones are sold at £1 each, in Paris at 20 francs per pair, and in Vienna a cheap form may be had for about 3 shillings: a mistree at Roorkee makes them for Rs. 7 each.

As regards the practical application of telephones, they are extensively used in Germany between small towns not previously connected by telegraph: the difficulty of transmitting messages in foreign languages is got over by spelling out each word and acknowledging letter by letter. In London certain newspapers have telephonic services between the houses of Parliament and their publishing Offices, the communications of the Reporters being transmitted by this method. On the Norwegian Coast an elaborate system of telephones has been established in

connection with the herring fishery, an important national industry it frequently happens that a shoal of herrings enters one of the numerous bays along the coast at a time when few or no fishing boats are at hand: the news of the event is then telephoned to neighbouring villages and large numbers of boats at once proceed to the spot. In America telephones are very extensively used for domestic and business purposes: it has been proposed to attach them to every railway train to admit of communication between Engine-Driver and Guard. There are said to be 14,000 sets in use and this number increases at the rate of 1000 sets a month. In England the use of the telephone is at present very limited: it was tried as an auxiliary by the Postal Telegraph Department but has been found unsuitable: it is stated however to be of value in working coal and other mines. The Torpedo Department of the United States Government, it is stated, now places a telephone inside each submerged torpedo so arranged as to cause a telephone on shore to emit sounds so long as the torpedo is in its proper position and the electrical circuit remains perfect.

Although the Bell Telephone has been brought to a high degree of efficiency there are some points in which it is obviously open to improvement: there must always be loss of power in transmission so long as the waves of sound are directly applied to set up the electric current, and it has been calculated by Professor Werner Siemens that only about one ten thousandth part of the mass of sound communicated at the sending end is emitted by the receiver: then again it is necessary in talking by a Telephone to speak audibly and directly into the mouth-piece of the instrument: this is incompatible with secrecy, inconvenient to persons otherwise engaged within hearing, and more or less an effort: finally the currents set up by a telephone are not only too weak to traverse any great length of wire even under the most favorable conditions but are so feeble as to be mixed up with induced and earth currents so minute that in ordinary telegraphic working they would be quite imperceptible.

Reiss' Telephone already described although failing as a talking apparatus was free from these defects of the Bell Telephone: instead of causing the sounds to directly set up a feeble electro-magnetic current, as in Professor Bell's instrument, Reiss confined the functions of the sonorous vibrations to bringing into play a voltaic battery which may be regulated to transmit any required intensity of current and thus not only to convey without loss of power the original sonorous vibrations but even to considerably magnify them.

EDISON'S CARBON TELEPHONE.

Early in the present year Mr. Mr. T. A. Edison of New Jersey, U.S. designed a telephone in which he endeavoured to combine the speech conveying properties of Bell's Telephone with the sound-magnifying power of that of Reiss: availing himself of the previously known fact that certain preparations of carbon vary their resistance to the passage

of electrical currents according to the pressure applied to them, Mr. Edison caused a disc of iron to produce when vibrated a varying pressure on some powdered graphite inserted in the circuit of a battery, the resistance decreasing and consequently the amount of electricity flowing increasing in direct proportion to the pressure applied. Edison's receiver is based on the discovery that the friction between a metal plate or cylinder and a paper band saturated with a conducting fluid and pressed against the metal is diminished when a current of electricity passes through the paper to the metal. This alteration of friction throws the travelling paper band into vibration and produces sounds corresponding to those communicated by the sending carbon telephone. Edison's telephone has not come into practical use: it is stated to require the use of induction coils as well as batteries, and that the result is not superior to that of the Bell Telephone.

THE HUGHES MICROPHONE.

Shortly after the invention of the Edison Telephone in America Professor D. E. Hughes, working independently in London, produced in varied forms an apparatus in which the sonorous vibrations affect the points of contact between two or more surfaces of certain conducting materials interposed in the circuit of a voltaic battery, and thus directly produce variations in the strength of the current flowing without the intervention of the disc or diaphragm used by Reiss, Bell and Edison in their respective patterns of telephone. This apparatus for magnifying sounds Mr. Hughes called the Microphone: he first experimented upon a stretched wire in the circuit of a battery and telephone and obtained a sound in the telephone at the moment of the wire breaking: when the broken ends of the wire were lightly pressed together sounds uttered within range of this crude microphone were distinctly reproduced in the connected telephone: the next form tried comprised two common nails laid parallel on a sounding board with a third nail laid across them to complete the circuit: gold, platinum, mercury, clean lead, carbon, graphite and metallized charcoal were also found to be suitable materials.

The form of microphone which was at first most generally adopted consists of two blocks of gas carbon fixed to a vertical board and having a third piece of carbon with pointed ends lightly pivoted upright between them: the pivoting carbons are connected to the wires so that battery, microphone and telephone are all in one circuit, and the strength of the current of electricity set up by the battery in this circuit is so altered by the effect of sonorous vibrations upon the points of contact of the pieces of carbon as to cause variations in the magnetization of the electro-magnet of the telephone, the effect being the same as when the transmitter is also a telephone.

An efficient microphone should have a high range of variation of resistance to sonorous vibrations. If the pressure at the points of contact be uncontrolled the working of the apparatus cannot be reliable

it will be either very sensitive to minute sounds in which case louder sounds will cause violent breaks of continuity at the points of contact, or it will render loud sounds clearly and be unsuitable for conveying very faint vibrations. An endeavour has recently been made to increase the range of the pattern of microphone above described by attaching to the upright carbon a piece of iron wire and adjusting a magnet at such a distance from it as may be found necessary; the nearer the magnet is approached to the iron-carrying carbon the more unsensitive does the microphone become and consequently the more capable of rendering loud sounds which with a more sensitive adjustment would produce the jarring inarticulate noises due to violent interruptions of the electrical circuit.

Another form of microphone adopted by Professor Hughes consists of a hinged bar of carbon one end of which is made to rest on a block of the same material, the degree of pressure being adjusted at will by means of a light spring: this is another mode of increasing the range of a microphone.

Another very sensitive and reliable form which I have tried is one described by Mr. A. M. Vereker in the Telegraphic Journal of the 1st August. 1878: he covers one end of a small drum with parchment the centre of which is gummed on a pointed piece of graphite having a fine wire attached: the drum is then fixed on its side on a board: an upright bar of gas carbon, having also a light wire attached to it is hinged to a slide on the board so that its upper end rests against the pointed graphite the pressure at the point of contact being regulated by an adjustable spring: Mr. Vereker has also a spring arrangement for causing the parchment diaphragm to bulge out at its centre, but I have found this lessen its sensitiveness and if the desired forward tension be imparted to the parchment when fixed wet on to the drum it will retain that shape when dry. This form of microphone I have found to render audible in the telephone sounds so minute as to be quite imperceptible to the unassisted ear while by tightening the spring louder noises are clearly rendered.

At present the microphone is practically only a transmitter the Bell Telephone being invariably used as the receiving instrument. It is true that certain forms of the instrument are said to have been found to give out articulate sounds but at present no pattern of microphone can at all compare with the telephone in this respect.

THE PHONOGRAPH.

The Phonograph is a purely acoustic instrument and electricity or magnetism has nothing to do with its action. A vibrating membrane at the bottom of a mouth-piece carries a stylus or blunt pin: the material of this stylus being found to affect the articulation diamond, sapphire or ruby is now used for the purpose: a cylinder having a shallow groove cut on it is made to revolve so that the stylus follows

the course of the groove. To prepare the instrument for use it is only necessary to cover the cylinder with tin foil : on rotating the cylinder the stylus impresses a line on the foil but not to the full depth of the groove : if sounds be now communicated to the mouth-piece the membrane is made to vibrate and the stylus attached to it indentes the tin foil with a succession of points more or less deep and more or less close together according to the loudness and tone of the sounds. After the sonorous vibrations have been thus recorded if the cylinder be restored to its original position and rotated the stylus, in passing over the roughnesses and depressions previously made by it on the tin foil, causes the membrane to vibrate and to give out exactly the sounds originally communicated to it. If the tin foil be carefully removed from the cylinder and preserved the words or music recorded on it can be reproduced at any time on any phonograph having an exactly similarly grooved cylinder. The first phonograph sent to England when exhibited in London gave out the word "How do you do ? How do you like my phonograph ?" these words having been spoken to it by Mr. Edison, ^{its} inventor, before he despatched it from America.

The sounds imparted to the phonograph are said to be given out with wonderful exactness including accent and imperfections of pronunciation but the general tone of the human voice is reproduced thin, feeble, and slightly nasal. The latest pattern of phonograph made by Mr. Edison is stated to give out articulate sounds audible at a distance over 100 yards. The London Stereoscopic Company have paid to Mr. Edison £3,000 for the right of manufacture and sale of phonographs in England the inventor receiving also half the profits. The price of a Phonograph at present ranges from 5 to 30 guineas

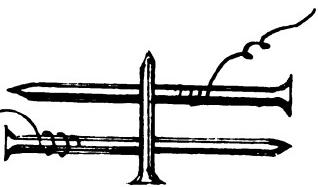
General MacLagan, in returning thanks to the Lecturer, remarked that there were two services which the lecture had rendered. In the first place those who had heard it would be better able to follow hereafter with interest and advantage what they might read regarding the progressive improvements and new complications of those instruments. It was of course impossible to acquire from one lecture an entirely accurate impression of them, but this would be one great use of the lecture they had now heard. In the second place the tendency of Mr. Lane's lecture was, in a manner, to abate the popular and exaggerated ideas formed with regard to the success and results of those instruments. No doubt the first accounts published in the newspapers did lay hold of the most essential of the very prominent features of those inventions, and the very remarkable results produced by them, and the consequence, he thought, had been that upon those representations had been based a number of ideas more or less indefinite, and more or less imaginative, with regard to what those instruments could do and had done ; and it was therefore a great benefit to have actual facts placed before them, and to see exactly how far progress in these instruments had gone. Many most remarkable results would no doubt be attained by those instruments hereafter, but up to the

present time this was not the case and Mr. Lane had rendered good service in showing the precise stage which those instruments had reached. The great resemblance between the microphone and the corresponding instruments used for magnifying objects of vision had also led to some misapprehension. There was a pretty general idea that we were already almost in possession of an instrument which could do for sound what the microscope does for objects of sight—that we might, for instance, by applying the instrument produce a sort of 40 power, or 80 power or 100 power enlargement of sound, just as we do now with regard to objects of vision. It was possible that some such result would be attained in the course of a few years, but in the meantime it had not been attained and it was right to limit our ideas to what had been already reached. Mr. Lane had mentioned that Professor Hughes gave the name 'Microphone' to the instrument which he devised. But it was interesting to notice that the name 'Microphone' was applied, more than fifty years ago by Mr. Wheatstone, (now Sir Charles Wheatstone), to the enlargement of sound produced by a direct solid contact—the conduction of sound through solid materials. General MacLagan here referred to the familiar experiments of transmitting sound through a solid board or table, the suspension by string attached to the ears, of a poker, which when gently touched give out a sound like a cathedral bell; and proceeded to explain that this was the kind of instrument to which Mr. Wheatstone gave the name 'Microphone.' It magnified in this direct manner the sounds to which the instrument was attached only that Mr. Wheatstone's connecting media were wires with two metal discs at the extremities to be placed on the ears. As an instance of the exaggerated ideas formed regarding this instrument, General MacLagan referred to the extravagant opinions formed about what was called the "tramp of a house fly" across a box, explaining that these matters had now been reduced to their true dimensions. With some further interesting general remarks illustrative of Mr. Lane's lecture General MacLagan proceeded to say that it concerned the Members of the United Service Institution more particularly to consider what might possibly be the application of those instruments to military purposes. The subject had been considered and a few elementary papers upon it had appeared in the Journal of the Society. It was certain that at present the matter was quite in an initial stage, and it was possible that before this time next year some other lecture would describe what had been further done with regard to the application of those instruments to military purposes. In the meantime little had been done. The few endeavours made had been not altogether satisfactory; and there was one point to be considered that whilst to certain Military purposes they were directly and advantageously applicable, in practicable warfare the noise prevailing around must be a serious impediment to their use. When these difficulties had however been overcome, it might possibly be found that they could be applied with great advantage. In the meantime the field telegraph would probably continue for some time to be the most direct mode of applying those

instruments. Mr. Lane's sketch of their exact stage and progress was exceedingly valuable, and he had shown himself competent to treat the subject from the scientific as well as from the popular side.

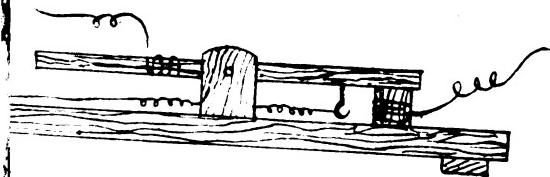
11

6.



Nail Microphone.

Com-
rsaw in
st, but
Clerks,
as still



Horizontal Microphone.

Excel-
icers, I
of the
evna—
for me
moment
formed

noon
levées
eneral;
to be
Camp;
our as
of the
hateau
niform
. The
s simi-
anglers
ajesty,
iew.

h the
guard
Good-
jesty,"

o S. in
Gen-
ised 1
other
They

Corps, with respectively 4 and 5 Companies each Battalion. They

III.

ROUGH NOTES ON THE RUSSIAN ARMY IN 1876.

By CAPTAIN MONTAGU G. GERARD.

2nd Regiment, Central India Horse.

Having obtained the permission of His Royal Highness the Commander-in-Chief to attend the Russian Camp of Exercise at Warsaw in September 1876, I found myself there towards the end of August, but as, thanks to the innumerable difficulties raised by the War Office Clerks, my application for permission had been greatly delayed, I was still without official sanction from the Russian Government.

Though provided with private letters of introduction to His Excellency Count Kotzebue, Governor General of Poland, and other officers, I was informed by General Prince Schakoffskoi the courteous chief of the Staff, who subsequently commanded at the second battle of Plevna—that unless officially accredited, he feared it would be impossible for me to accompany the staff during the Emperor's visit. At the last moment however, a telegram from our Ambassador at St. Petersburg informed me that I was duly authorized to attend.

The Czar arrived on 30th, the first parade being ordered for noon the following day; prior to which I was directed to attend at levees held by H. I. H. the Grand Duke and by the Governor General; the latter; after a most kind reception, informed me I was to be attached to the deputation of Prussian Officers present at the Camp; consisting of General von Wartensleben—designated by rumour as Marshal von Moltke's successor, and five others. Two officers of the Imperial Guard acted as our hosts at Sielee a small Imperial Chateau in the Park; and through them we received daily orders as to uniform and hours of parade, and when to attend in the palace court yard. The Austrian Governor General of Galicia and staff of five officers was similarly entertained, and one Saxon officer completed the number of strangers present. At noon we had the honor of being presented to His Majesty, shortly after which we mounted and attended his staff to the Review.

On the way to the Champ de Mars I was much struck with the effect of the daily greeting exchanged between the Czar and any guard or troops encountered en-route; to the former's salutation of "Good-Morning my Children," a loud shout of "Good-morning your Majesty," replying in chorus.

The troops were formed across the "Mokotouski" from N. to S. in 8 lines. The first 5 of Infantry, 6 and 7 of Cavalry, and No. 8 Gendarmerie and Battalion de Fortresse. Each line of Infantry comprised 1 Division of 4 Regiments, of 4 Battalions for Guard and 3 for other Corps, with respectively 4 and 5 Companies each Battalion. They

were formed in line of Battalions, at close intervals, in company columns quarter distance, 4 companies of 40 files the No. 5 (Tirailleur) companies being formed into separate Battalions on this occasion.

Cavalry were by Regiments, close interval in quarter column; Regiments of 4 squadrons of 60 files. Each line composed of 5 Regiments.

The Artillery, the Horse of 6, and Field of 4 Guns per Battery, were, the former in column and latter double column of Batteries, and seemed to average, the former 15 to 20 men and horses, and latter 20 to 25 men and 10 horses per gun. They were echeloned to the left rear of the other Arms.

The Staff State, which was kindly shown to me, is here appended:—

<i>Imperial Guard.</i> —III Division	...Infantry	...16 Battalions.
3rd Brigade	...Artillery à pied	24 Guns.
<i>Grenadiers.</i> —II Division	...Infantry	...16 Battalions.
2nd Brigade	...Artillery	... 20 Guns. 4 Mitrailleurs.
<i>Ditto.</i> —III Division	...Infantry	...16 Battalions.
3rd Brigade	...Artillery	... 20 Guns. 4 Mitrailleurs.
<i>Line.</i> —VI Division	...Infantry	...15 Battalions.
10th Brigade	...Artillery	... 20 Guns. 4 Mitrailleurs.
VIII Division 1st Brigade Infy.	6 Battalions.	
8th Brigade	...Artillery	... 20 Guns. 4 Mitrailleurs.
X Division	...4th Regt.	... 4 Battalions.
<i>Rifles</i>	...	... 4 Battalions.
<i>Spahis</i>	...1 Brigade	... 3 Battalions.
<i>Artillery</i>	...Garrison	... 5 Battalions.
<i>Fortresse</i>	...	... 2 Battalions.

Cavalry.

Imperial Guard.—II Division, 2nd Brigade.

Hussards de Grodno, Ulans de L'Empereur 8 Squadrons—6 Guns.

Line.—VI Division.

1st Brigade 6th Ulans, 6th Dragoons.
2nd „ 6th Hrs., 6th Cossacks, 16 Sqds. 12 Guns.

XIII Division	...	...16 "	12 "
	Caucasian Cossacks	...	1 "

The Line Batteries were the 11th, 12th, 20th and 7th Cossack.

Total 87 Battalions, 41 Squadrons, 150 Guns, or 48,000 men.

After a minute inspection, Regiments cheering as the Emperor rode down the ranks, the march past began, Infantry leading—in column of companies, close order, each in succession at the saluting point greeting the Czar with a shout.

Cavalry followed in open column of squadrons, the Ulans of the guard led by His Majesty in person. Most went by at the trot, some at the gallop and the Caucasian squadron at the charge; the changes of pace being sounded by two Circassian trumpeters in attendance on the Czar.

Artillery followed; Horse by Batteries and Field double column both with full intervals.

Grenadiers and Tirailleurs now doubled past. There was a singular absence of noise in their tramp, the toe only seeming to touch the ground, body well inclined to the front.

The following day, after attending the blessing and presentation of colours to the Ulans of the guard, came Cavalry manœuvres, 41 Squadrons, 30 Guns, lasting several hours and followed by a march past. Everything passed like clock work, so much so, as to induce a suspicion that all movements were prearranged. Signals with swords were largely used by commanding officers, and what with repeating words of command, to a greater extent than customary with us, and frequent cheering of the Emperor by different regiments, the parade was a somewhat noisy one.

Dragoons acted almost entirely dismounted, skirmishing and attacking positions with fixed bayonets, and seemed trained to attempt to charge the latter from far too long a distance. Cavalry also, when charging were not kept in hand, but broke from the trot to the charge, when full 300 yards distant from their object. Their pace however is vastly inferior to ours all through, and the horses seemed incapable of a real gallop. As a proof of their sluggish natures, the ranks at the conclusion of a charge of this duration, were but little more disordered than after advancing at a trot, and there was, certainly, no reason to attribute such a desirable result solely to superior horsemanship.

The Cossacks, who in their peculiar upright seat ride uncommonly well, are mounted on ponies, of 13-2 to 14 hands, much resembling Deccanee tattoos with less breeding, fiddle headed and Roman nosed. None of the skirmishers, save the Caucasian Cossacks, fire from the saddle; these spurt to the front at a gallop, or rather "a run," which more correctly describes their pace, fire and wheel at the same instant, returning at speed to rear of skirmishing line to reload, I fancy it is intended for effect rather than actual service.

That evening all foreign officers, and those of the Ulans of the Guard, had the honor of the dining with the Emperor, subsequently to which we attended the State Ball of the Governor General.

The next day was a counterpart for the Infantry and Field Batteries of what had been gone through by the Cavalry on the preceding, but heavy rain abruptly cut short proceedings. In the evening the Camp assembled at Alarin posts on the signal of three rockets. The Cossacks were the quickest in turning out.

After a grand Church Parade on the Sunday, on Monday the United Horse Field Batteries manœuvred and practised. Average range 1,300 to 1,500 yards, 4 prs. and 9 prs. 6 rounds a gun, Section and Shrapnel shell. Targets consisted of wooden screens, representing troops in column with a front of 25 files, 3 rows, at 50 yards distance. They were marked to represent Infantry and Cavalry $3 \times 7'$ and $9'$ —distances were said to be unknown, and practice was very good indeed, but ground was smooth, hard sand, where there concussion fuzes had every possible advantage. The mitraileurs at about 900 yards riddled the centre of targets, leaving the flanks almost untouched: the fire seemed far too concentrated. During a storm in the forenoon one Battalion was struck by lightning 7 men killed and 49 wounded.

The next day there was a long inspection of field works, huts of every description, both permanent and temporary, bridges, railways, camp kitchens &c., all constructed by the line troops, and detachments of all arms were practised in throwing bridges, replacing and dismantling railways and telegraphs, and finally the Cavalry pioneers, in blowing up bridges and embankments with dynamite, all of which duties were performed in a manner indicating a very careful training.

In the forenoon of the following day firing of picked Squads from each Regiment at ranges from 1,000 to 500 yards, supposed to be unknown, but figures here and there cut in the turf possibly assisted them. 60 temporary targets were erected in line across the Mokotouski, opposite which the several detachments formed in single rank, 2 rounds per man, any position allowed. The majority fired lying, some sitting, few, that I saw, kneeling. The score with some of the targets was very good, but as there were no markers, ricochets figured largely in the result. In the afternoon firing of Cavalry detachments at 400 to 500 yards. As a rule their practice was very much too low. A large proportion in fact seemed to ricochet about midway; a result scarcely satisfactory with Squads presumably of picked men. Dragoons, as before, fired with fixed bayonets.

The Camp concluded with a sham fight, in which the entire force took part, on the large plains to the West of city. The ground perfectly open, in parts was broken by sand hills and clumps of pine in others, but as neither fences nor nullahs existed, and the soil throughout was sandy, what features of ground there were, merely served as screens and not as obstacles to the troops. The proceedings lost much of their interest through the Cavalry being entirely employed in large masses, and imposing looking charges and demonstrations against the enemy's

horse, and the actual manœuvring being left practically to the Artillery and Infantry.

Infantry attack was, as a rule, in line of skirmishers, single rank, with 4 or 5 paces frontage per file one company in column of sections or divisions 200 to 300 yards in rear, in support of each one in front, with a third line 200 yards to the rear, of about half the strength of second line. One Battalion in column of Companies acted as a reserve to each two in its front. Artillery fire was slow and well regulated, but the Nos. 1 at the guns did not think it necessary, so far as I could see, to go through the form of laying their pieces when using blank cartridge.

The Emperor departed for Odessa at the conclusion of the manœuvres, previously to which we had again the honor of dining with His Majesty, besides being commanded to the state representations at the theatre of the Palace and at the Opera. The Camp shortly after began to disperse, the ordinary garrison of Warsaw consisting of 27 Battalions, 12 Squadrons, and 40 Guns. After a few days spent in looking round the Camps and barracks, being shewn every facility by the authorities, and being allowed to see everything under its every day aspect, and examine horses, arms, and accoutrements freely. I subsequently spent nearly a couple of months travelling about, and paying visits, and was able to form the conclusion that the force at Warsaw was decidedly a picked one, and very superior in many respects, both in physique and armament, to that of an ordinary Line Regiment.

Service.—The period of service with the colours is at present, as a general rule, 4 years for Infantry and 6 for Cavalry and Artillery; furlough being granted for the remaining portion of the 7 years to which they are liable before passing into the reserve for a further period of 8 years ; liability to serve continuing from the 21st to 36th year, only a percentage of those liable are said to be required, and are selected by ballot. As it is estimated that there are 6,000,000 men in the empire within the required age, deducting a third for exemptions, 4,000,000 would still be available, so that by the time the present system, introduced in '72 or '73, I think—has had time to develop itself in 1888 by utilising only 50 per cent, of those legally liable, Russia should possess an army of 2,000,000 men. The present Militia, Frontier, and other local battalions which in '76 formed the only Reserves to the Army, being destined to replacement by the regularly constituted Reserve Battalions, have been of late years much neglected, and their cadres will probably be amalgamated with those Battalions. To mount Cavalry Reserves, Government have the power to seize all private horses in war time on payment of 75 Roubles=£ 10.

Cossacks serve alternately 3 years with their Regiments, and spend an equal period on furlough, during a total of 18 years.

The Army now consists of :—

Cavalry, Guard.—1 Division Cuirassiers 2 Brigades.

1	"	Light of	3	"
<i>Line.</i> —14	"	"	2	"
<i>Caucasus.</i> —2	"	"	3	"
<i>Cossack.</i> —1	"	"	2	"

Each Brigade comprises 2 Regiments of 4 Squadrons, which on grand occasions parade 60 files strong. The 1st Brigade of each Division contains 1 Regiment Ulans, 1 Regiment Dragoons, 1 Battery (6 guns) H. A. and 2nd Brigade contains 1 Regiment Hussars, 1 Regiment Cossacks, 1 Battery (6 guns) H. A. All are numbered according to their Division. Thus the XI contains, 11th Ulans, 11th Dragoons, 11th Hussars, and 11th Cossacks and two batteries of Horse Artillery—not brigaded as the Field are—are permanently attached to each Division.

This gives a total of 82 Regiments = 336 Squadrons, and 246 Guns.

The Guard Cavalry, comprises in its 1st Division :—The "Chevalier Garde" the "Horse Grenadiers," the "Horse Guards" and the "Cuirassiers."—The light Division. The Ulans of the Guard "Grodno" Hussars, Dragoons, and the Atman and Ural Cossacks War and peace footing is alike for Cavalry and Horse Artillery.

In addition to the above, there are large Reserves of Cossacks : those of the Don divided into 3 Categories. Each class comprising 20 Regiments, numbered from 1 to 60. The 1st Category only are called out in peace time, and the 3rd are not even obliged to keep up their horses and arms. As beyond a certain number for outpost and orderly work, a large Cossack force would prove an encumbrance rather than a help, if dependent on their Commissariat for forage, this large addition numerically is rather an apparent than a real element of strength.

Artillery.—Field Artillery is organised in Brigades, of 6 Batteries, with 4 Guns each, on peace, and 8 on War footing. Brigades at present have 3 Batteries 9 Prs. (Krupp) 2 of 4 Prs. and 1 Mitrailleus. The latter I was informed are to be replaced by 4 Prs., and relegated to flanking defences. The Horse Artillery are armed with 4 Prs. One Field Brigade is attached to, and bears the numbers of, each Infantry Division.

Infantry. Guard.—3 Divs. of 4 Regts., of 4 Battns., of 4 Comps
Grenadiers.—4 " of 4 " of 3 " of 5 "

except the 4th Division *Caucasus.*

which has :—

<i>Line.</i> —41	"	of 4	"	of 3	"	of 5	"
------------------	---	------	---	------	---	------	---

except the 19th, 20th and 21st Caucasus

which have : 4 Battalion of 4 Companies.
Rifles.—7 Brigades of 4 " of 4 "

Engineers.—5 Brigades including 11 Battalions of Sappers.

3 " Reserve.

6 demi " Pontoniers.

6 " Parc Telegraphique.

In all 4 Battalion Regiments the 4th Battalion, and in 3 Battalion Regiments the 5th Company are Tirailleurs: but the whole of the Infantry are shortly to receive the same organisation as the Guards to whom and the Caucasus Force, any change is first applied. This gives a total of 48 Divisions = 632 Battalions (including Rifles) with 1,152 Guns on the peace and 2,304 on War footing. The strength of a Battalion on paper is about 550 on peace and 1,000 on War footing, Rifles 1,000.

Cavalry.—Recruits for this arm are chiefly drawn from the South of the Empire, Little Russia about Kiev, and Poland, where ponies abound and the peasantry ride much. The men's seat is good but they are but little practised singly out of the ranks. The Squadron is the administrative unit, divided on parade into demi Squadrons, and sections: numbered from right to left instead of flanks to centre. Drill is by "threes" and with pivots; 1 pace only is allowed as distance between ranks. The trot is the pace of manœuvre; and gallop 380 paces a minute = 10·5 miles an hour. Both demi Squadrons and sections form close as well as open column. Squadrons are of 60 files, bands 18 or 20 strong 2 guidons to each Regiment. Lancers and Hussars differ only in name and uniform: the front rank of each carrying lance, revolver, and sword, and the rear rank carbine and sword. Dragoons carry short Infantry Rifles and bayonets. At present they are armed (1870) with the "Krinka," In the new "Berdan," the bayonet is to be still adhered to. Lancers have only one bucket on off stirrup, and the usual sling without a keeper. Steel scabbard of ordinary pattern, except for Cossack and Dragoon swords. All Artillery, Gendarmerie and Police also carry the Dragoon sabre: which

Fig. 1. has a leather covered, wooden scabbard, with brass mountings, and is suspended across the right shoulder; the rings being attached to the front and not to back of scabbard, the sabre hangs edge to rear and is far more convenient

Fig. 3. sabre hangs edge to rear and is far more convenient for dismounted service. The carbine is slung in leather case across left shoulder "en bandoulière." Both ends of sling are sewn round the cover, the lower about height of breech, and within 18 inches of the upper; the carbine thus hangs with muzzle in line with left shoulder, and butt in rear of right thigh. The cover opens down side, from trigger guard to heel plate, the bottom being sewn to prevent carbine slipping through. To "Unsling," the stud fastening flap is unbuttoned and carbine withdrawn, the case remaining on back. Dragoons carry their rifles "en bandoulière"

also, but slung without covers. All, at Warsaw save Dragoons, had the new Berdan .44 bore, 22" barrel, 7·3 lbs. weight; these still retaining the Krinka—a converted muzzle loader .59 bore, 30" barrel, weight with bayonet 9 lbs.. All men—in all arms of the service—not armed with Rifle or Carbine carry the Revolver, .44 bore Smith and Wesson 6 shooter, 7·5" barrel, in leather holster on right hip, with lanyard attached to ring of butt. I do not think the carbine and revolver ammunition is interchangeable at a pinch, as it is in the Austrian service.

The Hussar Sabre weighs without scabbard 2·5 and Dragoon Fig. 4. 2 lbs. Lance is 9' long, weight 6·5 lbs. and is needlessly clumsy; the men, in its management, as well as in Sword exercise left much room for improvement; and are I fancy taught to pin their faith to firearms.

The Austro Hungarian saddle—used also in German army—is the one adopted. The Cantle and pommel are very high, and tree raises the weight so needlessly above, as to be very apt to wring the back and unnecessarily distress the horse. The stirrups also might advantageously be attached an inch further forward. The panels of saddle are not padded, the blanket in 6 folds, alone interposing between the side boards and horse's skin. The arches are of iron. This saddle as used in the German army, is condemned most emphatically by our late Military Attachée at Berlin, as a fruitful cause of sore backs on service. The saddle alone weighs about 14 lbs. and blanket 9 lbs. valise of coarse grey cloth, and Crimean pattern wallets are carried, with the cloak rolled over them for men and on cantle for officers. Since rising in the stirrups has been introduced ("trot à l' Anglaise") the number of sore backs has greatly diminished, I was told. It seems remarkable that Continental nations, who have no word to characterise "rising in the stirrups," except "English-fashion," have unanimously adopted it in their cavalry whilst we still remain behind hand in this respect; another useless encumbrance, the crupper, still retained by us, has also been discarded by them. The ordinary double bridle is used, the bit being attached by hook instead of buckle; the port is low and far from severe. I have more than once found Fig. 4. this bit become detached when riding troop horses, but it would be easy to rectify this. Burnishing is not regarded as of much moment, and bits, stirrups and saddles were in much the state of our watering bridles. At a guess I think an average Ulan would ride, in marching order without forage, which is carried in nets, 16 or 17 stone. The contents of valise seem to be left pretty much to individual fancy and no strict rule enforced.

Line Cavalry as a rule, shoe only in front, Guards, all round Shoeing is very bad indeed, hoof and frog being pared excessively and even in summer high calkins employed. Of several horses I examined, some had 4, 5 and up to 8 nails. The sandy soil and

absence of stones alone prevent a large amount of foot lameness, I imagine.

The Guards at Warsaw had very good wooden stables, but as usual in Russia very imperfectly ventilated. The Line are as a rule billeted on villages, unless when in Camp during the Summer months.

All horses in the ranks are Geldings. The price of remounts varies from 220 Roubles for the Guards to 180 for the Line, about £ 32 to £ 25,

Most Regiments, notably the Ulans of the Guard, keep up a scratch band of side drums, cymbals, &c., and on the line of march the performers and best singers form up in a section at the head of the column, and strike up now and again some traditional song of the Regiment, the remainder all joining in chorus. They are preceded by a lance shaft surmounted by a gaudy French doll, and covered with sleigh bells, &c., which is jingled about to give the time to the rest. The men are greatly attached to the whole arrangement and take great pride in it: it certainly answers in keeping them in good humour on the march, but the effect on the ears of a foreigner is most discordant from a musical point of view, and only equalled by a performance on bazar tom-toms. Hussars wear the usual hussar uniform—tunic, and busby, pantaloons (extremely tight) and Hessian boots with straight, box spurs. Those of the Guard wear the pelisse. In undress the usual Russian flat topped forage cap with leather peak, is worn and utterly spoils the look of the dress. Dark blue and silver is the prevailing colour. Ulans have the ordinary lancer dress with plastron and Crjapka. Dark blue. Dragoons; Dark green; Shako and horse-hair plume, loose pantaloons; butcher boots and straight box spurs are common to all Cavalry.

A section of each Regiment are trained as Pioneers, and carry the necessary tools, and charges of dynamite to destroy railways, bridges, and telegraphs.

The daily ration for troop horses is 11 lbs. oats, 9 lbs. hay, 2·5 straw.

An examination in fencing is held to be a necessary qualification for promotion, but is, I believe, not very rigidly adhered to.

Each Regiment has ammunition, provision, and hospital wagons, in all 12 or 14 on the war footing mostly drawn by 4 horses, harnessed abreast. I am not aware how many of these are kept up in time of peace.

There are 4 Subalterns, 2 Company and a Field Officer to each Squadron, and the wings of Regiment, termed Divisions, are commanded by two Colonels on all occasions, who are supplementary

both to the Regimental Commanding Officer, and Field Officers of Squadrons. The Commandants of some Regiments are Major Generals.

Cavalry manœuvres lasting 15 days, which foreign Officers were not permitted to attend, were held at the end of September, under the Grand Duke Nicolas in the West of Poland. $4\frac{1}{2}$ Divisions = 18 Regiments = 72 Squadrons or about 10,000 Cavalry and 54 H. A. Guns took part. Though the weather was extremely cold neither tents nor billets were provided, save for the Officers. A Staff Officer present, assured me that 1 Brigade marched 85 versts = 58 English miles in the 24 hours. Many Regiments were brought by rail from a considerable distance and 1,800,000 Roubles = £ 250,000 was allowed by Government for damage to crops and other expenses.

It is somewhat difficult to form a just estimate of their horses, seen by themselves with no others present to compare them with, but they are manifestly inferior in every respect,—save perhaps hardiness—to English ones. The average height at a guess, seldom exceeds 15 hands, and their pace is I think inferior to that of ordinary country breeds out here. Bengal Cavalry whilst quite capable of meeting them in line, would be, I think, very superior to them at "loose practice."

1st Sqdn.	Men						
	Men						000000
2nd , , ...	Men						
	Men						
3rd , , ...	Men						
	Men						Squadron Officers.
4th , , ...	Men						
	Men						000000
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>							
Regimental Officers.							
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>							
Do. Train.							

The above shows Bivouac of a Regiment, requiring a space of 135 x 230 yards. Each squadron requires 15 x 155 yards.

Cossacks.—All Russian irregular Cavalry, even Georgians and Circassians, are termed Cossacks. They own horses and saddlery and "find themselves," (as our Irregular Cavalry), when in their own districts, receiving whilst called out 11 or 12 Roubles = £ 1-12-0 a month. When stationed in more civilized quarters they receive the same forage, rations and pay as the line Cavalry. Their Officers are likewise Cossack, but pass an easier examination than the rest of the Army. The men of the Regiments I saw, are decidedly a fine lot; fair hair,

and blue eyes, the predominating type ; amongst them you rarely see the Tartar features, so common in the Russian linesman. When they lose a horse on service they are allowed to draw pay during 4 months to replace it.

The Don Cossacks, as above mentioned, are organized in 60 Polks, or Regiments each of 6 sotinas, or "hundreds"—in addition to these are two Regiments of the Guard. They have 14 Cossack Batteries, of 2 guns on peace and 8 on war footing : both off and near horses of the team are mounted. The Kubau Cossacks, and those of the Terek, founded originally, by discontented bands who deserting Fig. 9. their country, settled along the Northern frontier of the Caucasus, have by intermarriage assimilated in a great measure with the Circassians. They muster 45 Polks altogether, of 4 to 6 sotinas but the whole organisation is in process of, or at least destined to revision. In addition to these there are, Siberian, Amur, Ural, &c., "bans" but all strictly local troops except a few Squadrons of the Guard, and never employed beyond their districts, as are those of the Don and Kuban.

All outpost and orderly work is performed by them ; and in time of war 1 Regiment of Cossacks is permanently attached to each Infantry Force. The rules for outpost duty are practically the same as in our service, the usual outlying picquets with double vedettes, supports, and Reserves being prescribed. When they act in conjunction with other Cavalry the latter always form the reserves. The relief of vedettes is with them somewhat irregular, 5 or 6 hours often. Picquets are relieved at day break. The Russians place great reliance on the natural sagacity, and bump of locality of the Cossacks, who are said rarely in a strange country, or the darkest night, to feel at a loss as to their direction. The horses, accustomed to graze through the swamps where they are bred, are particularly clever in boggy ground, and generally employed for "hunting" throughout the country by sportsmen ; they are extremely hardy, enduring and tractable, but as before stated, mere ponies, so utterly destitute of pace that Cossacks should if unsupported, be completely at the mercy of any fairly mounted Cavalry : as the latter could gallop either round or through them as suited their convenience. One Bengal Cavalry Regiment should be able to cope successfully with 2,000 Cossacks ; on the other hand their horses would probably thrive on short commons and work, that, if prolonged, would disable a large number of ours.

Uniform of the Line Cossacks, is greyish blue tunic without facings, and loose pantaloons of same colour with red stripe, the usual knee boot, but no spurs, busby without jelly-bag and plume. A plain snaffle is the only bit used ; there is no buckle in bridle, the whole being formed of thongs of greased leather, $\frac{3}{4}$ " wide, knotted together. Fig. 5. The headstall is generally in one piece, knotted much as rope headstalls for bullocks are in this country, with a spare thong and loop (sometimes replaced by a buckle) as throat lash.

Saddles are of a sharp, almost V shaped tree, a leather cushion, being strapped over to form seat, cantle and pommel exactly alike Fig. 5. and both rather high. Two pieces of leather are tied on and act as flaps, and two leather girths 6" or 8" apart are used. The usual valise is worn in marching order. 1 Pack horse is allowed to 10 men. Caucasian Cossacks wear the high Persian lambskin cap, and "Ascherskaska,"—a sort of long blouse with breast pockets for cartridges. Some of the Squadrons I saw wore brown, others red. The line Cossacks are all armed with rifle, lance, and sword. The former is a very light "Berdan," without trigger guard, a roughened knob serving as trigger, it is slung over right shoulder, the reason for its being thus worn is I presume for facility of mounting.

The lance is lighter than that for the line, the shaft of pine, head Fig. 7. without the iron side guards, and no shoe to butt. Length 10 feet. No bucket is used, a leather loop at bottom of shaft being substituted. When mounted the foot is passed through this before being placed in stirrup, and the lance can thus be carried slung, at a gallop, without the possibility of its becoming jolted out as from a bucket. A small wooden "tag" is sewn at centre of sling, and a brass ring runs on latter. On line of march the sling is passed through sword belt, and tag secured by the ring, so that a man has both arms at liberty, and with the aid of footloop may move at speed, perfectly unincommoded by, and without risk of dropping his lance.

The Tcherkess sword, worn by all Cossacks in the belt, has like Fig. 2. the Dragoon one, a leather covered wooden scabbard; the hilt has no guard. All swords I saw were of German manufacture, Rifles Russian, and Revolvers American.

The Caucasians do not carry the lance, and wear the rifle 'en-bandoulière' in a goat skin cover, hair outside. They also have a pistol and dagger in belt, and the usual Tcherkess sabre.

There are some Cossack Infantry Battalions, also, strictly local militia.

Artillery.—The Field Artillery have 4 Guns on Peace and 8 on War footing per Battery, with a complement for a 9 Pr. Battery of 220 men and 56 horses, and 320 men and 200 horses respectively. The Battery is commanded by a Colonel, the other Officers consisting of a Captain and 4 Subalterns it is subdivided into demi batteries of 2 sections each.

Horse Artillery, as before stated, have but one footing and 6 Guns with 250 men and 240 horses. There are 6 horses to their 4 Prs. the Field 4 Prs. having but 4 per gun, and the 9 Prs. 6 each. There is an additional Captain to each H. A. Battery.

300 rounds per gun are carried, about $\frac{2}{3}$ th with Battery and the remainder by the Ammunition Parks. 24 ammunition wagons are required for a 9 Pr. battery, and 8 for Forge, Provisions, &c. 12 rounds are in the limber, and 36 in each wagon. The proportions are about 46 per cent. shell, 35 shrapnel, 10 Carcasses, 9 case.

The charges for 4 and 9 Prs. are 1 lb. 10 oz., and 3 lb. 4 oz., with extreme ranges of 4,500 and 5,000 paces, and reduced charges for high elevations. Bursting charges of 7 and 14 ozs., and shells splinter into 50 and 30 fragments.

All the guns I saw were of bronze, and made by Krupp, the usual rifling and breech pieces; a spare one of which is in limber.

I believe they weigh about 7 and 12 cwt. respectively. Carriages of iron, trails bracket pattern with two seats on them for gunners. The limber can carry 3 Gunners, and 4 more be mounted on trail and axletree boxes. Horse Artillery Detachments had, on parade, 8 men and there were 2 wagons per Battery. Limber boxes are single, and clumsy to move: as they have fixed iron side rails for the men, they would smash readily in an upset.

All draught is pole and collar; the Centre horses being attached to Fig. 11. Wheelers by a Swingle tree bar from point of pole.

The length of traces seems quite needless. At least a length and a half separates Centre and 'WHEELERS, with half to two thirds of this betwixt lead and centre. I often saw traces dragging on ground when reversing and wheeling, and this must prove the cause of frequent hitches, if not accidents, in a broken country. A bar extends

Fig. 11. from splinter bar to point of axle tree arm, on each side,

in same mode as off shaft with us. All metal, such as trace hooks, is painted black, wood work light green. The hooks Fig. 10. are of most simple description, but seem to answer well enough. All the kit is carried on the riding, and nothing on the off horse, but the very simplest harness, of very light hip and flank straps passing over back and supporting traces, and a weak breeching just sufficient to prevent collar shifting forwards.

The sponge and rammer, and a couple of rounds in a leathern havresack are carried by the No. 4, even when marching past.

Gunners carry knapsack and cloak rolled on their backs, and are armed with Revolvers, and the Dragoon sword.

Field Artillery Uniform is the same as Infantry, and Horse Artillery as Dragoon.

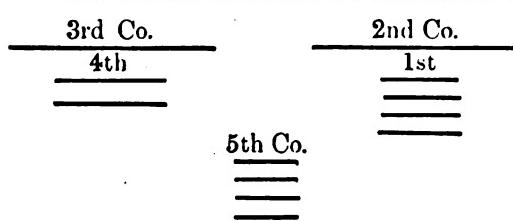
As both practice and manœuvring, that I saw, was over perfectly hard, sandy plains, where their concussion fuzes had every chance, and it was impossible to strain the harness, it is needless to say the results were very good.

The only peculiarities of drill I noticed are that wagons, in action are posted in rear of the flanks, and that in 'action front' the gun reverses before unlimbering, "Limber up" is as with us. Intervals are 24 and 20 paces for 9 Prs. and 4 Prs. in action, and H. A. detachments, in line, are in rear of the Guns. The Horse Artillery of the Guard were better horsed than any Cavalry I saw of their service. At manœuvres, Cavalry seemed particularly fond of masking H. A. Guns, and when charged wheeling outwards, disclosing them ready to open fire.

Infantry.—The Regiments at present possessing 5 Companies per battalion, are as above mentioned to be organized in the same manner as the Guards, which makes the difference of 16 instead of 15 Companies a Regiment.

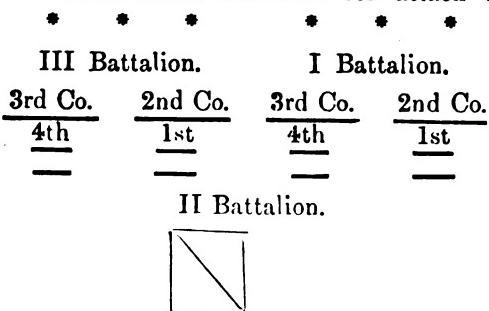
A Company on peace footing numbers about 120 and on war footing 210 men. There are 1 Captain and 3 Subalterns per company, a Colonel and Adjutant per Battalion, and a Colonel (or Major General) 4 Field Officers, Adjutant, Paymaster, and Fencing master besides Chaplain and 4 Surgeons per Regiment. A Regiment of Infantry numbers on paper about 2,200 men on peace, and 4,000 on war footing: in addition to 280 and 350 non-combatants respectively. A Battalion of Rifles 500, and 1,000 respectively—with 80 and 100 non-combatants; in the latter category of whom Officer's servants are always reckoned. Each battalion has a colour carried by a Non-Commissioned Officer. Companies are told off into half divisions and these into sections: always formed in two ranks. On parade, deployed, the next Officer in rank stands behind the Chef de Bataillon who is also accompanied by a mounted bugler.

The Normal formation for attack of a Battalion is:—



A distance of about 200 paces from skirmishers to supports, and from half to a third of that between them and the Reserve.

The Normal formation for attack for a Regiment is, as below.



Skirmishing line.

The position for guns is supposed to be between the 2nd Co., of 111 and 3rd Co., of 1 Battn., the skirmishers masking them being refused, and the reserve Battalion posted out of the line of Battery to one or other flank.

Whistles are used in signalling skirmishers. Captains of Companies are, as with us, not mounted. On parade Regimental Bands usually mustered 36 men, in addition to whom were 9 Drums and 9 Bugles per Battalion. All of these carry Revolvers.

Two hospital carts, bearing the Geneva Cross, accompany each Regiment at manœuvres, 1 with 4 horses harnessed abreast and the other with a pair. On the war footing the Regimental train consists of 5 hospital, 20 ammunition, and 50 other wagons nearly all of which for service have 4 horses. The Corps at Warsaw and Petersburg only, of those I saw, had as yet the Berdan : the remainder being armed with converted Muzzle loaders, chiefly on the Krinka and Karl principle. The latter has calibre of .59", and with bayonet weighs 16.09 lbs. Their new weapon the Berdan has a calibre of .44", and weighs 9 lbs. 2 oz. without bayonet 80 rounds of ammunition—the amount carried—weigh 6 lbs. 14 oz. The ranges are supposed to be 1,200 yards for Infantry and up to 1,600 for Rifles. The Berdan in appearance much resembles the Chassepot, works in 5 motions has spiral mainspring and takes a solid brass cartridge case. It is undoubtedly inferior to the Martini and many other systems in point of rapidity though said to be a thoroughly reliable weapon under all tests—but has, according to continental ideas the advantage over any "under lever" action, that the soldier requires less exposure to reload when lying on the ground, than is necessitated by the "falling block" systems.

Dark green is the prevailing colour of uniform, with in summer white cotton trowsers. Helmet, with spike for marching order, and white horsehair plume for full dress is worn by the Guard, and Shako with black horsehair plume by the Line. The tunics of Guard have red and yellow facings, and edgings and lappets turned back of same colour. The line have only piping and not facings. Grenadiers have yellow shoulder straps, and Line, red, blue or white. The bands of Forage Caps in each Division are red, blue, white and yellow, for the 4 Regiments composing it. Belts are white, for Rifles black.

The Great coat of reddish grey camel hair, with hood, is of most practical colour and does not easily show dirt. Infantry wear knee boots, the same as Cavalry, and for all ordinary work have the trousers tucked into them. They do not wear socks. As a rule the heels were made too high and narrow, and I saw many instances of boots being "walked over" in consequence. Kit is carried in calf skin Knapsack, but a newer pattern of glazed Amerian cloth is being introduced. It is born by two straps, passing straight up and down, over shoulders to waist belt connected by strap across chest. Its weight is balanced by the ammunition, carried in two black, waterproof cases on either side of waist belt, each containing 40 rounds. The Cloak is carried rolled, over left shoulder, crossing chest and Knapsack. There is a cooking pot to every 13 men, besides 3 large ones per Company, and each man carries mess tin and water bottle. The Guards in addition to bayonet,

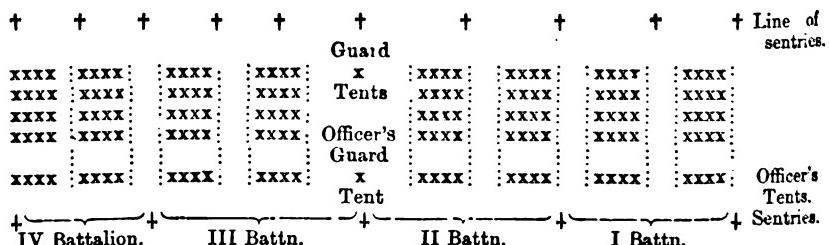
for which there is no sheath, carry the " tessak " a short double edged sword, much resembling the old French " Cabbage cutter," which seems greatly to incommodate the men, particularly at the double, and which might most advantageously be abolished. Bayonets are always carried fixed by Infantry on all occasions. I have heard that a Russian Soldier in marching order with 3 days rations carries 80 lbs. but this is, I think, greatly in excess of what he could do.

Pay is issued quarterly in arrears this is of less consequence as it amounts to about $\frac{1}{4}$ d. and $\frac{1}{2}$ d. a day for a private of the Line and Guards respectively, and to $\frac{1}{2}$ d. and $1\frac{1}{4}$ d. for Sergeants. On service the ration is $\frac{1}{2}$ to $\frac{1}{2}$ lb. meat, $\frac{1}{2}$ lb. peas or barley, 2 lbs. flour, salt, and $\frac{1}{2}$ Pint Brandy or Vodka. In peace they receive 2 lbs. flour, $\frac{1}{2}$ lb. barley and salt, in addition to which they have a mess allowance supposed to give $\frac{1}{2}$ lb. meat for every non fast day, which in the Greek Church is about every alternate one. The men bake for themselves: and the black bread though heavy and sticky is far better than it looks; they also make a kind of biscuit of which every Regiment must keep a 10 days stock, carried chiefly in the provision wagons. Officers in marching order carry a very small Knapsack about 15" x 12" x 4", cloak rolled across left shoulder the same as men, and revolver on right side of sword belt. They always carry the Revolver on parade or Guard; it is the same as for Cavalry but with a 5" barrel.

The Infantry in all sham fights I saw, seemed well trained to avail themselves of cover, and always attacked in some more or less loose a formation; we have frequently seen it stated that only columns were employed in the recent war; if so, it was contrary to what they had been used to practice, and some unforeseen cause must have led to its adoption.

In the vicinity of the Camps and barracks I saw very good open air Gymnasiums, with, amongst other things, portions of Field Works of different profiles, with various methods extemporised for crossing the ditch and getting down and up the counterscarps and scarpes: and by the marks on ground they were in very regular use.

The Regiments I saw in Camp were pitched as under—

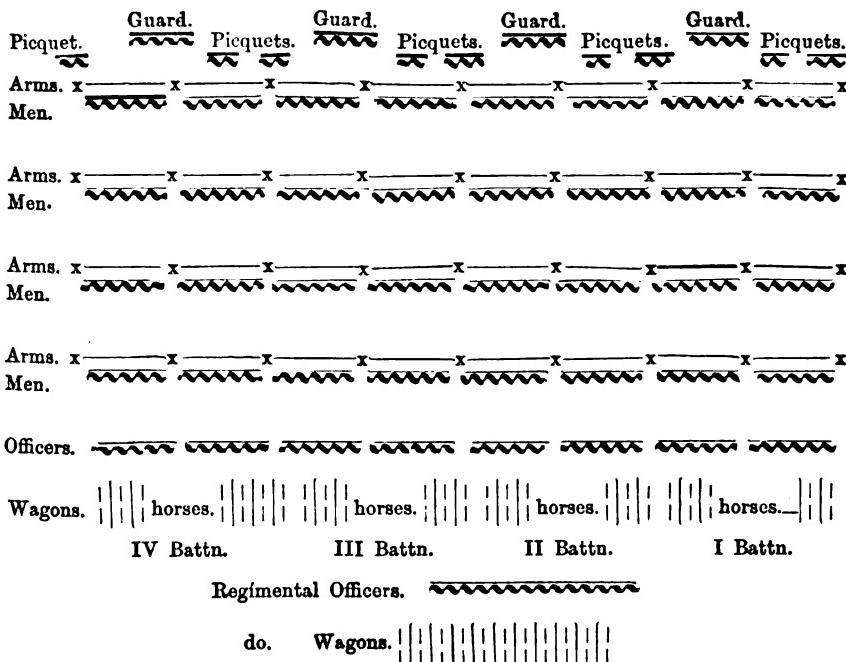


Each tent can contain 15 men, so each square of 4×4 for 2 Companies could hold 240. There was a centre road of about 40 paces,

and about 10 between each demi Battalion. Officer's tents about 30 paces to rear : the men's tents were pitched very close together and in some Camps surrounded by flower beds. Those of the Guards were surmounted by a brass bell and spike, which, with the flowers, gave an extremely gay look to the encampment.

The tents in use, having a centre, and 4 corner poles and guy ropes. The pitch of roof is very slight ; and the material being of coarse texture, they are by no means waterproof and quite unsuited for rainy weather. Whenever pitched for more than 24 hours, the interior Fig. 12. is excavated, as in section ; which I think could be done in about an hour. The earth is left for a width of about 3' all round the sides to serve for sleeping places. Shelves and arm racks are erected in centre. Of the various kinds of huts I saw, constructed by the troops, all permanent ones are more or less excavated, occasionally to the depth of 8 or 10 feet, and the camp ovens are built beneath the spaces left as sleeping places for the men ; the eaves of roof being almost at ground level.

The Bivouac of a Regiment in ordinary circumstances, is as here given.



Each Battalion occupies 70 x 125, yards about ; and with 35 yards intervals between Battalions, a Regiment thus bivouacked requires a frontage of about 370 yards by a depth of 190.

The Infantry of the Guards are of *particularly fine* physique, but with a peculiar, hairless type of face; which is indeed common to the greater portion of their troops. The linesmen though wiry and hard-looking, are of small stature. They are said to be particularly enduring as marchers; the ordinary pace is 115 per minute.

Corporal punishment up to 50 lashes is still in force; and summary punishments are more severe than in our Army. For instance a Captain may order 2 months C. B., and 5 days Solitary Cells, and to men already under punishment 15 lashes: and the Officer Commanding a Regiment may award 15 days cells, and 50 lashes.

In addition to the Regular Army there are numerous reserves of local Corps, most of which being destined to reorganisation, require brief mention. The chief of these are.

1. Reserve Battalions, for training recruits: numbering 80 Battalions besides some Instruction Squadrons numbering about 1 per Brigade. The Infantry might count roughly as... 80,000 men.
There are, likewise, some Reserve Batteries and Sappers.
2. About 50 Frontier Battalions chiefly in the Caucasus, Turkestan and Siberia roughly on a War footing ... 50,000 "
3. "Fortresse" Battalions, named after the Fort in which they are quartered and employed exclusively in Garrison duty; on war Establishment ... 25,000 "
4. Garrison Artillery, the complement of the Fortresse Battalions, and somewhat resembling our Coast Brigade ... 35,000 "
5. Government Battalions, and do. Detachments, who are simply a kind of Gendarmerie the former who number 50,000 being quartered in the larger towns, and the latter in the smaller districts. These number ... 60,000 "
6. The Militia or Landsturm supposed to include all not in the Active Army. They are not at present organized or drilled, and have to be clothed by their own Communes. They may therefore be considered as, much on a par with the "Franc-Tireurs" of the war of 71 and never likely to be called out save to repel an invasion.

The actual Reserves of the Regular army in 1876, were therefore at a very low figure, and save the men available from the 80 Reserve

Battalions, the men on furlough alone existed to raise Regiments to the War footing. Regiments when parading presumably as strong as possible at the Camps mustered as above noticed 1,500 to 1,600, and subsequently to the Emperor's visit I saw several detachments departing, apparently on furlough; probably men called in to fill the ranks during His Majesty's Inspection. It is therefore fair to conclude that Regiments then mustered 1,600 strong with the colours, and not over 2,000 as on paper. I counted at various times, 11 different Battalions on the line of march, with results varying between 176 and 262 rank and file with the colours, apparently only baggage Guards absent. Considering also the length of time the present organisation had existed, the number of men on furlough would be about half that of those with the Regiment, so that for an immediate emergency Russia could only bring 450,000 to 500,000 men and 1,152 Field Guns into the Field: the horsing of the latter, probably delaying its being brought on to the war footing for some months. The Cavalry would have a strength of 45,000 men and 246 Guns: and including Artillerymen and Engineers 600,000 seems the outside limit that Russia would have at her disposal, of Regulars. From this, after deducting Garrisons, for Turkestan, the Caucasus, Crimea, Baltic Provinces, and finally powerful Corps in Poland and on the Galician Frontier, we find that allowing 100,000 men for offensive operations in Armenia, it would be very difficult for Russia to bring more than 200,000 or at the very outside 250,000 into line on the Danube, and I think the history of the first few months of the war goes far to justify this rough estimate.

Officers receive their Commissions as a rule through, one of the many Military Schools in the Country. There are, (besides several elementary Military Schools), 1 for Cavalry, 1 for Artillery, 1 for Engineers, and 3 for Infantry at Petersburgh, containing about 1,400 cadets, of whom about 550 receive Commissions annually 400 of which are in the Infantry. Most of these only admit cadets belonging to the nobility and Official classes. Candidates, who must be between 16 and 20, pass an entrance test, and have a 2 years course for all save the Scientific Corps, who have a 3 years one. Those who finally pass out in the 1st Class are made Sub-Lieutenants, 2nd Class, Ensigns or Cornets, and 3rd Class cadets in a Regiment, whence they are promoted in turn to Ensign. Each Military district, 15 in all, has also its cadet school, which Non-Commissioned Officers of Regiments are, under certain circumstances, permitted to attend. During a third of the year these cadets serve with Regiments. About 800 to 1,000 commissions are annually given from these Schools. In peace Non-Commissioned Officers who have qualified, may be promoted by the Emperor only: but on active service the General of the Force has power to make such promotion on the spot. A similar rule is in force for promotion from one grade to another. It is regulated by seniority up to Captain in the Line and Lieutenant Colonel in the Ordnance Corps, after that by selection.

There are "Staff Colleges" for the General Staff, Artillery, and Engineers. All entered by competition, and with a "Course" of 2 years. Those passing out "with honors" receive a step of promotion.

There is a very great social difference between the Officers of the Guard and Staff, and those of the bulk of the Line; and while the former belong to the nobility, almost without exception, and are, as a rule, of considerable private means, a great number of the latter are extremely poor, and sons of Greek Popes,—as the priests are termed, Doctors, and petty Government employe's. I have often seen Line Officers both Cavalry and Infantry in uniform, travelling 3rd Class with peasants and Jew pedlars, though privileged to travel 1st at 2nd Class fares. The want of "caste" amongst these, cannot fail to tell most unfavorably on that part of the Army Officered by them: and readily accounts for the superior reputation enjoyed by the privileged Corps, who have the advantage of being Officered by men who have pride of class, as well as "esprit de Corps" to spur them on.

Officers have two rates of pay the one drawn in Peace, and the other in War time, and on certain stations. It amounts to about £ 90 and £ 140 respectively, per annum, for a Captain in the Guards, and to £ 65 and £ 95 for one of the Line. Ensigns getting £ 50 and £ 80 in the one and £ 45 and £ 70 in the other. Besides pay, they also draw lodging and, table and, subsistence allowances on the march, and ones for forage, servants, &c. &c., which brings their pay up to much the same as it is in England. On service Cavalry Field Officers are allowed forage for 3 chargers and 3 bâts horses, Captains, 2 chargers and 2 bâts horses, and Subalterns, 2 chargers and 1 bât animal. Physically the Russian Officers are a remarkably fine body of men, with an intensely Military tone about them, and their courtesy to foreign Officers is most extreme. It is their opinion apparently, that mankind is divided into two Categoreis, "Militaires" and "Pequins," and that whilst the latter; even of their own compatriots scarce deserve notice, the former of all services and nations are to be regarded as Brothers in Arms. I never received greater courtesy than I did from many Russian Officers, whom I accidentally met at Restaurants or the Theatre, solely on the ground I was an English Officer: and I think it is a great pity we know so little of them, as I am sure increased intercourse between our services would lead to mutual liking. Sport being almost unknown in Russia, and the climate during one half the year rendering open air life disagreeable, little or no exercise is taken save on parade: and I constantly remarked a preference on all sides for wheels rather than the saddle as a means of locomotion: Cavalry Officers even preferring to drive rather than ride when separated by a mile or so from their parade ground.

The number of decorations worn seems quite ridiculous. All troops quartered within the limits of Poland during the feeble outbreak

of 1863 have a medal for it, whether ever engaged with the insurgents or not. Captains, the extent of whose service had been the Khiva campaign, and a few months with a German Corps d'Armée in France, as spectators, had 8 or 9 medals and orders. The Russian Officers told off to entertain the Prussian Staff at the Warsaw Camp received each the cross of the Red Eagle for their service from General Wartensleben.

The Guard Regiments have very good Messes, the one I was at, being conducted exactly like ours; I believe the Line have not yet got them: those at Warsaw had only been established a few years. Warsaw and St. Petersburgh are the only two stations of the Guard.

Though many have learned English in their youth, few if any I met, could converse freely in it, owing to want of practice. French on the contrary, is used in society, more commonly than Russian and at Theatres, &c., it is usual to find the playbill printed on opposite sides in French and Russian, all invitation cards seem to be in French, and as a rule you hear a party of Officers, even when quite alone, conversing in that language.

Whether it is the result of any fixed system or mere accident, I am not aware, but Russian Officers seem physically well assorted to the different branches of the service, and the anomaly of seeing a 15 Stone Captain of light Cavalry, or a Grenadier Company commanded by an Officer of 5' 3" as in our service is so common, is at any rate of far rarer occurrence with them.

Railways.—One noticeable peculiarity in the Russian Railway system is that lines to the East of the Vistula are of a wider gauge than those to the West, which latter are similar to those in use throughout Germany and the Continent. The idea is, to prevent their proving of assistance to an invading Army, but the Prussians have elaborated a plan, and what is more, have already applied it to their own rolling stock, and by means of shifting axle trees can utilise their own engines and wagons on the Russian lines. The latter, I believe, have a plan also for adopting their broad gauge carriages to the German railways.

The main lines are only single, there not being sufficient traffic to necessitate a double roadway, though a second is to be laid down for strategical reasons between certain points. The rails are merely fastened on sleepers with spikes, and not laid in cradles, and seem scarce adapted to withstand the wear of fast and continuous traffic, so for Military purposes are less valuable than in appearance. Wood only is consumed in the engines, and frequent delays to replenish fuel are consequently inevitable, and what with the above and a certain oriental like indifference to time, the express train from Warsaw to Moscow, about 800 miles, takes 50 hours: a distance our Scotch mail would require 20 to traverse. A certain number of soldiers are trained

annually in the practical working of trains, to re-inforce the Railway Staff on an emergency.

The country, is exceedingly flat: I believe no point in European Russia up to the Urals, exceeds 900 feet, above sea level.

Some portions, are broken by enormous marshes and swamps thickly grown with alder and brushwood. Pine and birch forests everywhere abound, and it seems as natural to the Russian peasant to employ solid logs of timber, for every wall, fence or the repairs he has in hand, as it is to the Natives of this country to run up a mud wall. A Russian village from a little distance greatly resembles an Indian one, and the chief difference you perceive on a closer inspection is that the walls are constructed of trunks of trees, laid in horizontal rows, with earth and moss in the crevices. As to the want of method in the arrangement of houses and streets, and the utter neglect of conservancy there is absolutely nothing to choose. I have seen the mud so deep in the streets of villages that it was difficult to pass on horseback, and for anything on wheels it was quite out of the question. Similarly to this country, detached Cottages are but seldom met with. For nearly half the year snow hinders all agricultural operations, and save a little threshing the peasants are in a state of enforced idleness, enlivened only by visits to the liquor shop, when they can scrape together sufficient to indulge in their favorite pastime. There are Schools at each village, open only during the winter months, and every one of the slightest pretension has its Greek Church. The peasants seem, and those who know them intimately always assert, are, the best tempered people in the world, and appear to be a contented, easily amused body, without any of that awe for, or cringing before the nobility, we so often read of: they have many virtues but these do not include cleanliness and sobriety. In the country indeed they regard it as a right, and the owners as no intrusion, that they should promenade through his grounds and up to the doorsteps of his country house at any hour they please. There seem to be few restrictions on owning firearms, no law of trespass and no preservation of game, and the consequence is that, though there is nominally a "Close season," game, being shot by every one at all seasons, is all but extinct in most districts. It was long before I could be persuaded that the magnificent pine forests,—chiefly of a species resembling our English Spruce fir, with splendidly straight trunks of 100 or 120 feet, drooping branches and long pendent white moss—and endless swamps, were denuded of animal life; but after many an hour's hard work, and seeing but half a dozen head aroused in a whole day by a pack of hounds drawing covert, I had to admit its truth. On the whole, Russian villages are much poorer than those of this country, the land less highly cultivated, and the state of civilization of the lower orders about on a par. I would have thought the conscription, as the means of introducing the peasant to more civilized life, and showing him there was something beyond the dreary monotony of his own village, would have been a

valuable instrument for improvement, but I have heard it stated that those who have served in the Army generally enjoy a doubtful reputation at their homes, being more particularly addicted to petty thefts.

The roads, bridges, and communications generally are far inferior to those in this country. There are a few paved Military Chaussées, passing straight from point to point, between the principal towns, which may be counted on your fingers. Elsewhere the country tracks much resemble the village ones here, about the middle of the Monsoon; indeed I have seldom even on black soil, seen roads in worse order than they are in the autumn with them. Traffic is only easy in the winter, by means of sledges. The nearest approach to a Ferry boat, for miles on the Dnieper, was a raft of green timber so imperfectly secured, that our horses legs kept slipping through between the logs, and we had to stand in water up to our ankles; I was told there was no better mode of crossing for nearly 50 miles. The more I saw of the country, the more I wonder how the French Army ever succeeded in procuring, or carrying the necessary supplies, in their advance on Moscow in 1812, and how Napoleon ever hazarded himself with such communications to trust to.

The great attachment to and respect for their religion is a most noticeable feature in the country, and the Czar being the head of the Church, is a source of enormous political power for his Government. In spite of the reported mention in the Papers of socialistic dangers to the country, I should imagine the Revolutionists must be so enormously in a minority, that no real danger can arise. Moscow with its 500,000 or 600,000 inhabitants has 1600 Churches. Not a man passes the door of one without removing his cap and crossing himself and many in addition kneel on the pavement for a half minute or so, also. Government strongly fosters this feeling: there is a sacred picture above one of the gates of the Kremlin, and a couple of Gendarmes stationed there, make every one, Jew, Atheist, or Christian, pass bareheaded for a dozen paces on either side. As an instance of the blind fanaticism, which animates the Class, the murderer of an Austrian Attachée of legation, a few years since, was proved to have done so, and freely avowed it to procure the means of paying a vow of wax candles to some neighbouring shrine, and had not attempted to appropriate a single Kopeck for himself.

Whatever may be the faults of this unreasoning devotion, it at all events must prevent their having anything in common with revolutionists, one of the first articles of whose creed is the abolition of all Religion. All Foreign Books, more particularly Bibles, &c., are submitted to a rigorous Censorship, and the latter altogether prohibited. All Foreign Newspapers are likewise "corrected," and it is rare to find a file of French papers without at least one column erased. The Russians are accused of a rather forcible system of proselytism towards the Roman Catholics of Lithuania and Poland. I can only say that

in Warsaw itself there seems no sign of interference with the Catholic Churches, which appeared to enjoy greater prosperity than under Prince Bismarck. One valuable auxiliary of the Government in Poland, which seems to neutralize to a great extent the ill will of the rest is the Jewish element, who see that it pays best to go heart and soul with the stronger party. They form a very large section of the population induced originally to settle by a Polish King, enamoured of a Jewish mistress—and all Banking, and Mercantile affairs being in their hands they have far greater influence than results from mere numbers. With all these influences in her favour Russia should have less to fear from Revolutionary Societies than any nation of Europe. The Police are certainly very inquisitive, but extremely polite, and it is undoubtedly of some advantage to know that if robbed by your servant, there are serious obstacles to his evasion; and that you may walk where and when you please with perfect immunity from the Roughs, and are not liable to be insulted for wearing a good coat as is somewhat common in our own country. On alighting at an Hotel, the Proprietor is held responsible, that you deliver up your passport within half an hour of arrival, it is not restored till you take your departure, of which notice is requisite.

As above remarked, French will carry you through the country, every man of education speaking it like his mother tongue, and as an immense number of the petty employés on railways, &c., are of German extraction, a slight knowledge of the latter will almost invariably prove of service, when the former does not suffice.

Dates are at first a little bewildering to a traveller, the Russian style being 12 days behind ours, thus the 20th July is with them the 8th. I believe the difficulty of persuading the working classes that they are not being defrauded of that number of day's wages, has hitherto been a principal objection to bringing it into accordance with that of the rest of Europe.

In conclusion I am happy to be able to bear witness to the extreme courtesy I was treated with by both Officers and Civilians, on all occasions, and that at a time when men were excited by the Servian War, and we were regarded as their implacable enemies; and I am sure that the suspicion if not dislike with which we are accustomed to regard every one of their nationality would speedily disappear on a better acquaintance.

M. G. GERARD, CAPTAIN,
2nd Regt. C. I. Horse,

IV.

THE TRIBES OF TURKISTAN.

BY, CAPT. J. M. TROTTER,

Deputy Assistant Quarter Master General.

The population of western Turkistan is composed of a large number of races the more important of which, namely the Kazzáks, Kirghiz, Uzbaks, Kará Kalpaks, Turkumáns and Tajiks it is proposed to describe separately in the following papers.

As regards ethnology they may be roughly classed as follows, *Turanians*, the Uzbaks, Kazzáks, Kirghiz or Kara Kirghiz, also known as the Burnts or in Russian as the Diko-Kamennye, Turkumans, Kara Kalpaks, Kipchaks and Nogais. *Arians*,—Tajiks, Gypsies, Persians, and a few Hindus and Afghans in the position of merchants. *Semites*,—Arabs and Jews.

The races above enumerated have with a few exceptions lived side by side for several centuries and although in some instances a considerable intermixture of blood has resulted, yet they have generally preserved their characteristic features and traditional modes of life to a remarkable extent.

As regards manners and customs as well as religion and superstitions, it is evident that many peculiarities must be shared by large classes of such a population, and before proceeding to describe each tribe in detail, it will save repetition to notice briefly a few of the points that are common to all, or to considerable sections, irrespective of race. From this point of view a more marked line of division is that which separates those who lead a settled life, whether in towns or in the country districts, from those who are purely Nomads.

The Nomad Races, comprise the great body of the Turkumans Kazzáks, Kirghiz, Kará Kalpáks, some sections of the Uzbaks and a few Gypsies and similar tribes.

The settled tribes, include the Tájiks, the greater part of the Uzbaks who while still retaining many Nomad instincts and predilections are practically settled; the Arabs, who although leading a pastoral life cannot fairly be called Nomads, as they inhabit, throughout the year, certain small and defined districts, the Mervi, Persians, Hindus, Jews and other small communities and lastly a few sections of the Turkumáns, Kazzáks and Kara-Kalpáks, who as will be seen from the following pages lead more or less settled lives, as fishermen or agriculturists.

Civilization among the Nomads.

Each of the Nomad tribes that we are about to describe has traditions more or less distinct and in some cases confirmed by authentic history, of a period when their race had attained a higher degree of civilisation and culture than that under which they now exist. No trace of a written literature exists among them, but a high antiquity is claimed for some of the Epic poems describing the deeds of the mythical heroes of the Kirghiz race which have been handed down orally for many generations, and both Kirghiz and Kazzáks are fond of listening to Lyric poetry which is frequently improvised and sung by their bards.

The dialect of the Turkumans is even more rich in poetry than that of the Nomads to the north of the Oxus and in addition to a mass of ancient Lyrics preserved by their bards, the whole race take special delight in listening to the recital of the works of Makhsumkuli a national poet who lived in the middle of the last century and whom they have elevated to the rank of saint. Many of the production of Makhsumkuli have been collected and committed to paper by Mullahs and others and are remarkable for the wide range of subjects which they embrace. They of course include many odes devoted to love and other matters usually treated of by Oriental poets, but also often deal with the arts of war and contain precepts for the guidance of raiding parties, as well as observations on horse breeding and other national occupations. They are also said by Vambery to be of great value as a specimen of the pure Turkuman dialect.

As regards education very little has been done by Russia among the Kazzáks and Kirghiz with whom she has been brought into contact during the last hundred years, beyond the introduction of Mullahs and with them of an illiterate form of Mahomedan bigotry into the steppes.

Both of these races are minently conservative by nature and although some few notable exceptions may be named, it seems probable that no desire exists among the mass of the people or can be instilled into them for education, or for any measures tending to modify their ancestral customs or to elevate them from the very low position they at present occupy in the scale of humanity.

With the Turkumáns the case appears somewhat less hopeless. It is true that many sections of the tribe are distinguished among all other Orientals by their ruthless habits of plunder and by their unmerciful treatment of the prisoners who fall into their hands; but this is in part due to their position as a numerous and warlike race living in a country which produces almost nothing, bounded on one side by the Persians, an unwarlike people entirely unable to protect themselves from their attacks and on the other by the Uzbak Khanats, where an unlimited demand exists for Persian Slaves. In other

respects the Turkumans compare favorably with the other Nomad races of Central Asia.

Their manufactures such as carpets, felts, jewelry and other articles for domestic use, show considerable skill in their workmanship and a surprisingly high order of art in their design, and are produced in sufficient quantities to supply a considerable export trade to Bukhara, Russian Turkistan and other neighbouring countries.

The accomplishments of reading and writing are unknown among many sections of the tribe, but de Bloqueville in his account of his captivity among the Tekke mentions that a great desire for instruction exists among them and this is confirmed by several recent Russian writers who assert that the practise of agriculture, which implies a settled as opposed to a Nomad life, and a certain consequent degree of civilization, is on the increase among them. The fact appears to be as above stated that much of the intractable savageness of their national character is due to their mode of life and the nature of the country they inhabit, and it is certain that wherever water has been found for them and land suited to irrigation, they have of late years shown signs of settling down and abandoning their predatory life. As soldiers they are decidedly superior to their neighbours and the Armies of Nádir Shah, Agha Muhammed Khan and other successful Persian leaders have owed much to the strong contingents of Turkumáns which have served in their ranks.

By religion the Nomads as well as the settled inhabitants of Turkistan are Sunni Mahometans with the exception among the latter of a few isolated communities of Galchas (hill Tajiks) in the more inaccessible mountains to the eastward; these are of the Shiah sect whose doctrines had probably at one time a much wider extension among the Arian portion of the population. A few sections of the Kirghiz are also said to have adopted the Buddhist creed from their

Among other products of Turkistan noticed by le nord newspaper in the St. Petersburg, exhibition of 1879, the helmet of a famous Kirghiz Chief ornamanted with figures of Buddha in gold.

Chinese neighbours and as will be seen from the separate descriptions of the two tribes, the Mahometanism of both the Kirghiz and of the Kazzáks is of modern date and of rather doubtful orthodoxy.

The settled districts of Western Turkistan, and notably the Khanat and city of Bukhara, are chief centres of the most bigoted forms of the Musalman faith, but although the decisions of the Doctors, of the Bukharan Colleges has great weight throughout the civilized countries of Islam, the conversion of the people of the steppes has been less due to their proselytising zeal than to the misdirected efforts of the Russian officials, shortly after the annexation of the little and middle Hordes.

Until comparatively recent times the religion of the nomads of Western Turkistan was Shamanism possibly modified in some parts by Buddhism and elsewhere by relics of the Sabian creed. The word Shaman is generally supposed to be derived from the Persian *Samān* an idol, but Fergusson and other eminent authorities refer it to *Sramana*, the Chinese rendering of the Sanscrit word *Vihara* a Buddhist monastery. This religion, which may be defined briefly as a belief in the existence and active agency of evil spirits and in the necessity of propitiating them by various rites and ceremonies, still competes openly with that of the Prophet in some of the remoter parts of the steppe and has its own priests, known as Shamans, who conduct the ceremonies peculiar to it. Elsewhere its traces are found in a number of strange superstitions and observances, such as omens drawn from the flight of birds, the proceedings of horses and various other animals, and similar natural phenomena.

The name 'nomad,' a *pasturer* of cattle and thence one who wanders in search of pastures, describes with sufficient accuracy the life of the populations of the steppes, but these tribes although on the move during the greater part of the year and traversing a vast extent of country in the course of their annual migrations, roam only in accordance with laws established by immemorial custom, each tribe confining itself to certain wells or tracts of grazing ground, to which by priority of occupation or other *lex non scripta*, they have acquired a right.

The dwelling of the nomads is every where the dome shaped felt tent, known as the Kibitka, of which good drawings will be found in Michels 'Russians in Central Asia,' Schuyler's Turkistan and other works. It consists of a framework of wood covered with sheets of felt, crossed by diagonal bands to strengthen them and keep them in their place and has upright walls and a hole in the dome shaped roof, serving as chimney and window. Among the more wealthy and skilful tribes, such as the Turkumans and Uzbaks these tents are often ornamented with carpets and felts and on the Pamir the space between the framework and the felt is filled with reed mats covered with worsted. These Kirghiz tents were found by Captain Wood to measure 14 x 8 feet, and with all their furniture were carried by three Yaks. The Russians fully appreciate the value of the Kibitka as a protection from sun and cold and use them extensively for the shelter of their soldiers in the Turkistan province and in the Transcaspian Government. The Kazzák Kibitkas used for this purpose weigh 400 lbs. each and accommodate 15 soldiers,

The next stage connecting the felt tent with the more substantial dwellings of the settled populations is a structure built on exactly the same shape as the Kibitka, but covered with reeds. These are extensively used by the semi-nomad Uzbaks in the Hissar provinces as well as by some of the poorer classes of Turkuman settlers on the Bukharan bank of the Oxus.

The houses of the settled tribes are, as might be expected, much the same as those seen elsewhere in Asia, those in the great towns approximating to the Persian type. In the province and town of Hissar houses are often built with high gabled roofs which are compared by Meyef to those of the villages of Great Russia, and in the towns nearer the Oxus, such as Kubádián, &c., the Afghan type of domed roof is generally adopted. Even among the settled people the Kibitka is popular as a habitation and in the country districts of Bukhara the cattle are often lodged in farm steadings while the owner of the premises lives in a felt tent pitched in the courtyard.

The political constitution of the Nomad races is very interesting and will be described in the account of each of their great divisions. The instincts of the Kazzáks are decidedly aristocratic and before their annexation by Russia the Government of the race was entirely in the hands of their leading families. Among the Kirghiz the chiefs have never had the same amount of influence or authority and until comparatively recent times the Office of Manap or ruler was elective and even now their families have an aristocratic position. The Turkumans are even more republican in their institutions than the Kirghiz but although they nominally acknowledge no chiefs, hereditary or elective, yet the whole race is influenced in its public and private transactions by a code of unwritten law or custom, any deviation from which renders a man an outlaw from his tribe and exposes him to general reprobation.

The languages spoken in Western Turkistan are the Iranian dialects, described under Tajiks, which are spoken by such of the Arian inhabitants as have not adopted the Turki language and secondly the language usually known as Eastern Turkish. Of this we have

Mr. Schuyler does not mention the authorities on which he founds his statements. more or less detailed accounts by Radloff and Schuyler, which will be found under Kazzáks as well as by Vambery in his *Cagataische Sprachestudien* according to which there are three dialects or *tili* of Eastern Turki.

- (1.) Chinese-Tatar or Uigar.
- (2.) Chagatai or Uzbak.
- (3.) Turkuman *tili*.

The first is divided into a town and country dialect, that of the towns being spoken by the settled inhabitants of Kashgar and containing traces of Persian and Arabic, and the country dialect which is the language of the Buruts (Kará-Kirghiz) of the Tian Shan and Zangharia, being influenced both as to vocabulary and writing by the Buddhist religion and by the Chinese and Mongol dialects. The Chagatai is a less primitive but more civilised dialect than the Uigar and is the origin of the Stambouli Turkish and of the language of Western Turkistan. In Khokand the pronunciation is rough and harsh, owing to the

propinquity of the Nomads in the North-East but the vocabulary of the language is not much affected by this, In Bubkara again it is modified by strong Persian influences and in Khiva also it is affected by the large number of Sarts and of Persian and Azarbajáu slaves.

There is thus, according to Radloff, a town and country dialect (*Sart tili* and *Uzbak tili*) throughout Western Turkistan and the more a man is educated the more he tries to change his idioms and make it as un-Turkish as possible. The Mullahs do the same with the children in the schools and generally those who know Persian abandon their Turkish and any one who has studied Arabic endeavours to cultivate this language and neglects Persian, and every official has a Mullah by his side to write for him, who uses Persian as a matter of course.

The third dialect, the *Turkumán tili*, forms the connecting link between Eastern and Western Turki—between Uzbak and Azarbajáu.

The Kirghiz and Kará-Kalpák dialects are classed separately by Radloff but appear by all we know of them to belong to the Chagatai class. The Kirghiz is the purest Turki according to this authority and after it the Kará-Kalpák and Turkumán,

THE KAZZAKS.

The people known to their Asiatic neighbours are Kuzzáks but by the Russians erroneously called* Kirghiz or Kirghiz Kaisak are an ancient Turk race and are mentioned by name in Firdusi (1020 A. D.).

They came under the sway of Chinghiz Khan and afterwards of his son Juji, forming part of the golden horde or sometimes attached to other hordes but, retaining their own chiefs. The Kazzaks, like the Uzbaks, were among the most prominent of the nations which arose at the decay of the Empire of Chinghiz and many Turk tribes are recorded as belonging alternately to one or the other, a circumstance which probably accounts for many of the subdivisions of the Kazzáks bearing the same names as subdivisions of the Uzbaks. Arslan Khan, a Kazzák chief who married a niece of Bábar, is said to have had a force of 400,000, men at his command and his people were at this time joined by many of the Kipcháks, Naimans, Konrads, Kukli, Jalair and other Turkish tribes. They seem then to have occupied a more circumscribed territory than at a later period, being shut in by the Zangharias on the East; the Nogais, Bashkirs and afterwards the Kalmuks to the West, and by the Siberian Tatars to their North, but

NOTE.—The name Kirghiz is applicable properly only to the the Buruts or Kará Kirghiz, called Diko-Kamennyi by the Russians, but is applied to the Kazzaks to distinguish them from the Russian ‘Cossacks.’ Schuyler says it is convenient to perpetuate this error, but as regards his own work the result has been that it is in several places impossible to discover whether he is referring to the Kazzaks or to the Buruts, when he is describing the portion of Turkistan where the countries of the two races are coterminous. No Russian writer with any pretence to erudition is ever guilty of calling the Kazzaks *Kirghiz*.

notwithstanding these disadvantages, they were destined during the next two hundred years to rise to a leading position among the peoples of Central Asia.

In 1598, one of their Khans called Teokel by Levschine was in possession of Tashkend, and of the town of Turkistan and established a dynasty which lasted till 1723, and attained considerable power and influence. Among the successors of Tevkel the most distinguished was Tiaoka the grandson of Sultan Ishem whose name is still mentioned with reverence and gratitude by every Kazzak, as a wise ruler and lawgiver, who united the different branches of the race and increased their reputation as warriors, by his successes against the Kalmuks. This Sultan entered in to negotiations with Peter the great for the submission of the whole tribe to Russia, but these were interrupted in 1718, by his death and the subsequent over throw of the dynasty.

According to some authorities it was during the reigns of Sultan Tevkel and his successors, which may be considered the culminating period of Kazzak history that the present division* of the race into great, middle, and little Hordes was first recognised. The history of the Kazzaks under this dynasty is imperfectly known but the dispersion of the race to the countries they now occupy was probably chiefly due to the great increase of their numbers, which at the time of the expulsion of their Sultans from Tashkend and Turkistan at the beginning of last century by the Zangharians, brought them into conflict with the Kalmuks, Bashkirs and other neighbouring races.

The town of Turkistan long continued to be in a certain sense their head quarters and is still regarded by them with peculiar veneration as the burial place of many of their greatest men and especially of their patron saint Shaikh Ahmad Yasawi.

The proposals made by Tiaoka for the incorporation of the Kazzaks with the Russian Empire were renewed by Abulkhair, Khan of the Little Horde, (a sketch of whose career will be found in the Chapter of Schuyler's work treating of the history of Khiva,) and were accepted by the St. Petersburg Government in 1731. Their example was eventually followed by the Middle Horde, which admitted the nominal supremacy of Russia fifty years later in 1781.

* NOTE.—The origin of this division of the race into great, little and middle hordes is unknown. The tradition is that a powerful than named Alach, who ruled the whole people at the time of the breaking of the white horde divided the various tribes among his three sons, the portion of the eldest being called the great, that of the second, the middle and that of the younger son the little horde. The story is not impossible when we consider the way in which tribes were distributed to different rulers by the Sons of Chinghiz (see the account of the formation of the Khanat of Shaibani in Deguisme's history. The word Horde is derived from the Turkish or according to Richardson's dictionary Persian word *Urdu* a camp. The latter is of course identical with Urdu as applied to Hindustani, the camp language and I have recently heard it used by natives of the Peshawer valley to describe the camp of a field force.

The Kazzáks, during this part of their history were engaged with varying success in constant wars with their neighbours, during which a portion of them migrated into Khiva and Bukhara. The result of the struggle appears to have been that a portion of the Bashkirs and Kalmuks were expelled from their former territory and driven further West, which brought the Lesser Horde into close proximity with the Russian frontier, and that the Great Horde became subject to the Zangharians.

From this period the history of each Horde diverges and may with advantage be viewed separately before proceeding to notice the conditions peculiarities which are common to the whole race.

The great Horde moved Eastward shortly after the time of Abulkhair and the greater part of them are now found in Russian territory, where in the Alatau province they number, according to Schuyler, about 100,000, of both sexes their chief divisions as given by Michel in 'Russians, in Central Asia' being the Jalairs, Atbans, Suvans, Dulats and Uigars in all according to this authority about 115,000 souls. In 1739, some of their chiefs proposed submission to Russia, moved there to by the prospect of commercial advantages, but they had not sufficient influence to carry the horde with them and the suggestion was opposed by the Zanghar Sultan Galdan Shirin, who took Tashkand in 1723, and soon after brought the great Horde under his rapidly extending sway. On the overthrow of his dynasty by the Chinese in 1756, the Horde were allowed to occupy the wasted territory and thus became Chinese subjects.

They now came into contact with the Buruts or Kara Kirghiz and many of their tribes being at constant war with the latter developed a taste for fighting which has not as a rule distinguished the remainder of the race.

In 1771, they made a fierce attack under Erali on the Kalmuks during the well known migration of the latter from the Volga to their old homes in Zangharia.

A large part of the Horde remained near Tashkand where they were joined in 1760, by considerable bodies of Kara Kalpáks who had been driven from their quarters on the Lower Syr. by the little Horde. They continued to harass and oppress the people of Tashkand and the neighbouring begships until in 1789, they were defeated finally by Yunus Khwaja of Tashkand who made them pay tribute and furnish a large contingent of troops for the wars in which he was engaged with Narbuta of Khokand and his other neighbours. The great Horde fell with Tashkand under the power of Khokand in 1814.

Meantime a certain number of their chiefs who had refused submission to Yunus Khwaja, moved with their followers Northwards to the Irtish where they joined the Middle Horde, and others went to the

Aktagh and neighbouring regiohs. A fragment of the Horde thus remained independant, while the remainder became subjects of Khokand, China or Russia.

For many years past the Great Horde has been directly in contact with the Russians, who have advanced upon them from the Semipalatisnk district and admitted them to the position of subjects of the Empire in 1847, building the forts of Kopal and Viernoe shortly afterwards for their protection against the Kará Kirghiz.

The Middle Horde, under their Sultan Ablai Khan, recognised the supremacy of Russia in 1781, but this appears to have been entirely nominal as they not only continued to make raids into Russian territory but at the same time swore allegiance to China. Ablai Khan's son Wali Khan* was recognised by a Ukase of Catherine II as Khan of the Middle Horde, but no permanent influence was brought to bear upon them by the Russian Government till the beginning of the present century, when Colonies from Western Siberia were pushed into the heart of their country and regularly organised as outlying districts. According to Schuyler they are shown by the return of taxes to number at the present day 406,000 of both sexes in Southern Siberia and the country North of Tashkand.

As a rule the history of the Middle Horde has been less eventful than that of the rest of the Kazzak race. This is partly to be accounted for by the fact that their Khans have had more control over the people and is also due to their having as neighbours either a strong peaceable Government or tribes of their own kindred except at one point where their lands were conterminous with those of the Buruts.+ The portion of the tribe which settled on the banks of the Syr came eventually into collision with the increasing power of Khokand which state by erecting forts at Julik, Ak Mazjid, Kumishkurghan, and other points contrived after long fighting to reduce them to subission treating them with great severity. They were at the same time hard pressed by Khiva and the fact of their being Russian subjects gave the latter power an excuse for involving themselves in disputes with both Khanats. Towards the end of last century the Kazzaks were very numerous in the region but their numbers appear to have been somewhat reduced by this double persecution by their Uzbak neighbours. This Horde is divided into four races, which are again subdivided into 37 tribes.

The little Horde, called by the Russian the Trans Ural Horde, has in many ways been of more importance in central Asiatic history than heiter the great or middle Hordes. It consists of three races which are subdivided into 25 tribes and number according to Schuyler 406,000 individuals between Fort Peroffski, the Ural river and the

* NOTE.—We learn from Lerch that this Wali Khan was the grandfather of the well known Russian traveller Chokan-Valikhanow.

+ Kara Kirghiz.

Caspian. To these must be added 150,000, the number of the Inner Horde an offshoot of the little Horde residing in Europe between the Ural and the Volga.

The races are the Alim, Bayrelin and Yeti Rugu or Semi-Rod.

The first includes the following tribes, the Kitin, Ujraef, Chumekeyef, Chiklin, Jurtkarin, Kará-Sakál. Kará-Kisák.

The 2nd.—Consists of the Adaiff, Baibaktin, Alachni, Maskar, Kizilkurt, Cherkesh, Isyk, Bershef, Isentemir, yapas, Altun and Tazlar.

The 3rd.—Of the Tabun, Chumishli-Tabun, Kardarin, Tamin, Karain, Romodan, Telaif and Jizal-Bailin.

Each of these tribes is again split up into divisions and the latter into subdivisions which it is not necessary to enumerate.

The little Horde had in 1730, become nominally the subjects of Russia, and the Fort of Orenburg at the junction of the Or with the Ural was built for their protection,* but they continued for many years to harass their fellow subjects the Bashkirs, the Kalmuks on the Volga and the people on the Siberian frontier; as also the Zunghars often at the instigation of Russia. In 1756, after the fall of the Zungharian Empire the Russian, being alarmed at the increasing power of China urged the Kazzáks to attack the latter power but although sympathising with the Khwajas of Turkistan to whom as we have seen their brethren of the great Horde had long been subject, and generally favorable to the Musalman movement against China, the Kazzáks of the little Horde were afraid to join actively in warlike operations at so great a distance from their own homes.

Catherine II, in the early part of her reign, which began in the year 1762, paid great attention to the Nomad subjects of the Empire and endeavoured in various ways to civilise them, giving orders that they should be taught to bake bread, build houses, cut hay and various other accomplishments. Mosques and Schools were also instituted and various courts and mixed tribunals were established to decide disputes.

In 1782 to 86 an attempt was made, on the death of Nur Ali the ruler of the Little Horde, to abolish the Office of Khan and to divide the Horde into three parts under Governors with limited powers. It was hoped that this plan would result in the introduction of order and peace but it was abandoned after a few years trial and in 1791 Irali son of Abulkhair who had conquered the Kará Kalpáks on the Syr was made Khan by the Empress. The appointment was a bad one

NOTE.—This fort of Orenburg was on the site of the present town of Orsk. A new Orenburg was built in 1740, 184 versts lower down on the Krasnaya Gora and this again was moved a few years later to the mouth of the Sakmara.

and indeed according to Gregorief the re-institution of the Office was in every way injudicious and the Horde shortly afterwards became much disorganised* and many families left it altogether. Some renounced their allegiance to Abulkhair's family and joined the Middle Horde, others drove out the Kará Kulpáks and settled on their lands on the lower Syr where they took to agriculture. Another portion of the Horde attacked and supplanted the Turkumáns of the Ust-Yurt while others occupied the country vacated by the Kalmuks between the Ural and the Volga forming the Inner Horde.

The Khanat continued in the family of Abulkhair for another generation, when that system of Government was finally abolished by the Russians.

This *Inner Horde* was formed in 1801 by a body of the Bayulin, one of the three great divisions of the Little Horde mentioned above, who under Sultan Bukei begged to be allowed to occupy the above district. The Horde is known to the Russians as the Bukeieff or Inner Horde and from the circumstance of their long residence within the settled provinces of the Empire are better known and more prosperous than other Kazzaks. The same influences to a less degree have been brought to bear on the Little Horde Kazzáks on the Syr where Major Wood informs us that the cultivated area is yearly increasing and not a few Kazzáks are found living in considerable luxury in houses in Kazalinsk and Peroffski.

The Kazzáks appear throughout their history to have been always attached to the "hereditary principle." Before their connection with Russia their Khans had always been chosen from particular families and each tribe into which the Hordes were divided was also governed by a Sultan or Bi, an office which was hereditary in certain families. Against these latter Officials there was theoretically no appeal, but if they were found too despotic they were in practise deposed and replaced by the member of the tribe next in seniority. Matters were

* In many parts of Russian Turkistan the members of all three hordes are found grazing their flocks on the same steppes. Thus in the Syr Daria district they are distributed as follows according to recent returns by Lerch

Chimkand circle	...	31,000	families of the great horde
Perovsk	"	20,000	of little and middle hordes.
Aulia Ata	"	18,000	of Great and little horde.
Kazalinsk	"	12,000	" horde.
Kurama	"	12,000	Great, middle and little hordes.

In the Semeretch district they are distributed as follows:—

Viernoe circle	...	25,000	families of the Great horde.
Kopal	"	24,000	" middle
Sergiopal	"	24,000	" "
Tokmak	"	7,000	" Great

According to Stumm the Northwestern-portion of the steppes of the Syr Daria district is occupied exclusively by the middle and little hordes; The remainder of the Syr Daria province chiefly by the great horde and the plains of Semeretchk exclusively by the great and middle hordes. The same auther gives the aggregate number of the three hordes in both provinces as 867,000 of both sexes.

not much altered by the establishment of Russian supremacy, for all attempts at interference created a revolt and the Russians who till comparatively recent years were profoundly* ignorant of the manners and customs as well as of the religion and language of their Nomad subjects were content as long as disturbances were kept down and a moderate tribute was paid them by the Khans. The Kazzáks as a race have never for any long period submitted to oppression on the part of the Government to which they have been subject, their practice being when hardly treated to migrate† and transfer their allegiance elsewhere or if this were impossible to rebel. This has always secured them a fair amount of consideration from their rulers in matters regarding taxation which lasted until comparatively‡ recent times. The latter were thus practically independant and it was soon found that they not only encouraged the bands of marauders who continued to make the steppes impassable for caravans but, when it suited their purpose, stirred up insurrections against the supreme Government.

The Office of Khan was finally abolished shortly after the annexation of the Iletsk district, a tract rich in salt mines and belonging to the Kazzáks, which was selected as a favorable field for Russian colonization in 1810.

The experiment was first tried in the Siberian steppe which after the death of Wali, the Khan already mentioned, was divided§ into regions each governed by an administrative council of one Sultan elected by the tribe and five Assessors who were employees of Government.

The Orenburg region was similarly|| divided into three circles, the arrangement for administrative purposes, which differed somewhat from that of the Siberian steppe, being as follows. Taking the Kibitka or tent as the unit; from 50 to 70 tents composed an *Aul* governed by a *Storchine* elected every three years by the people; ten to twelve *Auls* composed a *volost*, (translated *baillage* by Russian writers in French) governed by an hereditary Sultan and fifteen to twenty *Volostes* again formed the *Circle* which was administered by a *Starchi Sultan*. This Official was elected by the *Volostes* and presided over a mixed commission with executive and judicial powers. Care was taken to make the grouping of the *Auls* coincide as far as possible with the old tribal

NOTE.—* See l'professor Gregorieff quoted by Schuyler, also Kuhn.

† Thus during the last insurrections in Western China 16,000 Kazzak families migrated into Russian territory where they were willingly received on payment of a small tribute to people the vast unoccupied tracts. Mayef in his account of his expedition to Hissar in 1875, mentions finding numerous settlements of Kazzáks who had migrated to this country, where their name was before unknown, from districts lately annexed by Russia.

‡ The annexation of the Kazzáks was completed in 1873 by the absorption into the Empire of the Kizil Kum desert to which large bodies of the tribe from Chimkand and other districts had fled on the promulgation of the new steppes code.

§ Lerch.

|| General Heins quoted in Journal de St. Petersburg June 1878.

divisions and that the Sultans and chief rulers should be chosen as formerly from among the "white bone" or aristocratic families and the lesser ones from the "black bone" or commonalty, a point on which the Kazzáks were very tenacious. Thus preference was always shown in elections, to the family of Abulkhair for the Little Horde and to that of Ablai for the Middle Horde Sultans.

The system adopted in the Siberian steppe appears to have answered fairly well and about 1832 the Kazzáks of this Government were so far civilised that their administration was approximated to that of the settled districts. This was no doubt in part due to the large number of Russian colonists who, tempted by the comparative fertility of the country or deceived* by the representations of the Government Officials, established themselves in the heart of the Siberian Steppe or were deported thither against their will in the interests of civilization.

In the Orenburg Steppe, the rule of the Sultans proved to be in no way an improvement on the old system and although it was found practicable to extract a small tax from the Little Horde which in 1837, was collected from 15,506 tents and in 1846 from 67,280, yet no progress was made towards the institution of law and order. Numerous disaffected spirits from the Siberian Steppes finding the strictness of the Russian rule insupportable joined the Little Horde and the latter was for many years kept in a continual ferment by a succession of "*Batyrs*" (Heroes or fighting men, generally representatives of leading families. Among these Sultan Kenisar Kasimoff who for six or seven years defied the most active of the Russian Cossack leaders, is particularly famous in the history of the Steppe. He was succeeded by an equally famous *Butyr*, Iset Kutibaroff, who during the Crimean War raised a large following among the Little Horde and for some years made any attempt at peaceful Government an impossibility.

This chief like most other Asiatics, was not found incorruptible and was eventually† won over to the Russian interests by a lucrative appointment after which the Steppe enjoyed comparative tranquility for some years.

In 1865, the administration of the Steppes was modified by General Cherniayeff, who divided the Kazzáks into the Western, Middle and Eastern regions, each under a Russian Official with a deputy but as the alteration involved no change in the minor arrangements for the

* See amount of the formation of such colonies in the Kopal country in Atkinson's "Upper and Lower Amoor."

NOTE.—† Similar measures have lately been tried with good effect in the case of the well known Batyr Sadyk who throughout the campaigns against Bukhara and Khiva was the implacable enemy of the Russian invaders. Two of his brothers now hold lucrative appointments under the Russian Government and a recent number of the *Journal de St. Petersburg* notices that Sadyk himself has lately condescended to be the guest of the Governor General.

Government of the Hordes, the Mass of the people were not affected and no discontent was felt.

In 1868-69, however a Steppe commission* was ordered to consider a new form of administration for the whole Kazzák race. The members were M. Girrs, (President) and General Balusek, Col.'s Heins, Mayer and Protzenko as members. Of these Col, Heins, who was the leading spirit of the committee was considered by Mr. Michel, H. M. S. Consul at Moscow, as "a most injudicious appointment," (vide his translations for 1868), but according to more recent† authorities, this new Governor of the Turgai province, knows more of the Nomads than any other Official in the employ of the Russian Government. The Commission spent a whole year in the Steppe studying their subject and the result was the code of regulations under which the Kazzaks are now living.

This code was most unsuccessful at first, but although severely criticised by many good authorities, it resulted in the eventual establishment of order throughout the Steppe, and in a very considerable increase of the Imperial revenue. Its provisions were no doubt opposed to the feelings of the people, in as much as their object was to do much as their object was to do away with all tribal distinctions and to replace the native rulers by Russian officials.

This was prejudicial to the interests not only of the Kazzáks of the white-bone or aristocracy, by whom the administration had hitherto been conducted, but also affected those of the 'black-bone,' who as above mentioned, had an hereditary claim to many of the smaller tribal dignities. Many of the officials by whom they were replaced under the new regulations, were the heads of Cossack communities, and the hatred with which the Cossacks were regarded by the nomads, as well as the largely increased revenue which was required from them, were probably the chief reasons of the discontent. In exchange for the increased taxation, the code provided for the maintenance of dispensaries with medecines, doctors and midwives, as well as of notaries and architects for each of the great divisions into which the Steppe was divided.

The first result of the new code was a general insurrection which completely put an end to trade across the Steppe and was not subdued, especially among the Adaeff and Kazzáks of the present Trans-Caspian Government, for several years.

The Kirghiz Steppe new forms part of six‡ provinces, Akmolinsk and Semipaláinsk for the Siberian Kazzaks, subject to the Government of Western Siberia; Ural and Turgai, under the Governor General of Orenburg; and Semerechinsk and Syrdaria under the Governors

NOTE—* Turkistan Gazette.

† Journal de St. Peterburg May 1878.

‡ Steppe Campaigns translated by Capt. Clarke.

General of Turkistan. To these may be added the Mangyshlak circle on the Eastern coast of the Caspian, for the administration of the Adaeff Kazzaks, which is under the Government of the Caucasus.

For administrative purposes the districts under the above mentioned provincial Governors are divided into Uyezds, which are again subdivided into Volostes and Auls. An Aul consists of 100, to 200, Kibitkas and a Voloste of 10 to 20 Auls. The inhabitants are amenable to the Russian criminal code, but tribal matters are settled by courts composed of Bis, who are unpaid and elected by their fellow countrymen.

The Adai and some of the other sections of the Kazzaks on the shores of the Caspian, have on several occasions earned a good reputation as soldiers in their encounters with the Russians, but the race as a rule although good horsemen and fond of raids which do not entail much personal risk, are not partial to fighting.

In 1873 the Jijjits accompanying General Verefskins staff were formed into an *Ortz-Militz* or local militia, but although found useful as scouts they would not stand under fire and Stumm relates that they constantly "bolted" on the first appearance of the Yomut Turkumans. Their natural timidity has no doubt been a great cause of the success which the Russians have met with in their attempts to settle the Steppes. They are now prevented from raiding by the garrisons of the numerous posts along their borders and by the recollection of the tremendous retribution exacted by the Russians, for the revolt which followed the introduction of the new Steppe regulations.

The tribe are now probably more prosperous than they have been at any other time of their history, notwithstanding that they are unmercifully fleeced by Russian officials and that their camels have been constantly pressed* for Military purposes without any remuneration being received by the owners. General Heins,† in a paper published in May 1878, by the St. Petersburg Gazette also mentions that their interests have suffered materially from the constant change of Governors General, who have each had theories of their own regarding the Government of nomads.

* In the Khivan campaign the Russian official news papers announced that the Kazzaks had insisted on furnishing carriage gratis as a proof of their loyalty. More recently also the Kazzaks of the Aulia-Ata, and other districts of the Sir-Daria province, has received the thanks of the Emperor for large contributions at the rate of 1 rouble per Kibika in Aid of the Russian field ambulance train, and of the Voluntier fleet !! See journal de St. Petersbourg for May 1878.

† General Heins already mentioned in describing the new Steppe regulations, speaks in the same paper of the necessity of treating the families of the deposed Sultan with deference and says that it must not be supposed that the influence of the chiefs of the white-bone has ceased to exist.

Some of these officers, of whom Generel Petrovski is the chief representative, have held that they should be kept strictly to their traditional occupations of camel and cattle breeding, while others of less conservative principles, have considered that they should by all means be encouraged to abandon their wandering life in favor of agriculture.

The Kazzáks are new classed, as regards religion, among Sunni Mussalmans, but it is tolerably certain that until the begining of last century the creed of the Prophet had made but little progress among the inhabitants of the Steppes. The Russian authorities in the time of Catherine II, were as already mentioned, strangely ignorant of all that concerned the nomad tribes admitted by the Empress Anne to the privileges of Russian subjects. Their religion at this critical period of their history was undoubtedly Shamanism* and according to Gregorieff, most of the tribes that wander over the steppes which formerly belonged to the Khanats of Khiva and Khokand are still practically unconverted, while other writers assert that many of the superstitious rites, modes of divination and auguries practised by the Musalman Kazzáks, are relicts of their ancient faith.

Levschine† who passed a long time among the Kazzáks, gives an unfavorable account of them, according to which they are usually of a morose tempérément, disinclined to noisy sports, very credulous and greedy of news the receipt of which is their greatest pleasure; otherwise they are lazy, sleeping a great part of the day summer and winter. They are fickle, vindictive and not to be depended on and their "barantas" are usually made in pursuit of vengeance, the feuds thus created spreading indefinitely. Like Stumm he describes them as susceptible and passionate but not really brave and says that when once unhorsed in fight they are helpless, and although with few wants they are proverbially greedy and avaricious.

Among their few virtues is their attachment to their country and mode of life, to which they always return gladly if forced sometimes to leave it. They are also said to be not unsusceptible of gratitude for kindness and to show respect to the aged members of their families. The women are superior to the men, being active and kind hearted, affectionate to children and humane towards prisoners.

They bury their dead by preference on hills or elevated places and plant trees at the tomb, which are held as sacred as the tomb itself. The latter is also ornamented with rude sculptures in allusion to the quality of the dead, as arms over the tomb of a warrior, a cradle

* The origin of this term and an account of what little is known of the Shaman tenets will be found in the discription of the Burnts or Kara-Kirghiz and in the introductory remarks to these papers on the tribes of Turkistan

† Levschine "Sur les Kirghis Kaisaks" a book which is constantly quoted without acknowledgement by Schuyler.

on the tomb of a child, a falcon on that of a hunter; sometimes a turban carved in wood or stone or simply a heap of stones. The corpse of an eminent man or leading Sultan is often carried to the town of Turkistan and buried there near the tomb of their great national saint Khwaja Ahmad. Schuyler mentions an extensive cemetary near Karabákchi with large masonry tombs* of which he gives sketches, and Macgahan speaks of large solitary tombs sometimes met with in the Steppe, consisting of a central dome 30 or 40 feet high, enclosed by a high wall 40 to 50 feet square.† Their marriage ceremonies closely resemble those of the Uzbaks but the relations between the sexes are on a much freer footing than among the settled tribes. Men and women can make each others acquaintance or marry when they please, provided that the suitor can pay a sufficient sum‡ in money or kind to the parent of the Bride. As in the case of the other Nomads there is curious absence of sexual jealousy in the social life of the Kazzáks and in many tribes the host is said to make over his wife as well as his tent to a guest. The whole nation are by nature and preference nomads but wander only in the summer, passing generally over the same ground and using the same wells. These wells are constructed with enormous labor and are the property of the individuals§ or families who excavate them, and breaches of the peace very generally ensue when outsiders are found using them or grazing cattle in their vicinity. In winter each tribe and section has its own Kishlák or winter quarters where they pitch their tents or in some cases build huts. The tribes are therefore classed for administrative purposes according to the localities in which they pass the winter, and even in summer sufficient is known of their movements to enable the authorities to find any particular section or family which they may wish to lay hands on. Each tribe thus holds strictly to its own pasture grounds and the wealthier sections to whom the largest areas belong are able to maintain a purely pastoral existence while those who feed their flocks on inferior or smaller tracts go into permanent winter quarters in mud huts sometimes surrounded by mud walls and eke out a livelihood by agriculture.

Their winter quarters are chosen where practicable among sheltered hills or on the sands of the Southern Steppes, the vast areas covered by reeds, on the lower course of the rivers falling into the Arab, being also much frequented by them for the sake of the forage and fuel

* The Turkish race wherever they have wandered between the Bosphorus and Bengal have been famous as builders of tombs and many exact facsimiles of those of which we have drawings in the works of Schuyler Macgahan and other writers on central Asia may be seen along the Trunk road from Peshawar downwards. Compare also the drawings of tombs of the Mogul period in Fergusson's Architecture of India, with sketches by Schuyler, &c.

† The Kazzaks are of course ignorant of the art of making bricks or shaping stones for building but obtained these from the ancient buildings met with in many parts of the Steppe, which they demolish without compunction.

‡ See Uzbaks.

§ Schuyler says that they show considerable skill in selecting sites for their wells, being guided partly by the growth of a plant named Adrasban (*Peganum Harmala*.)

they supply. The sand also absorbs the sun more rapidly than the clayey surface of the plain and the water found there is sweeter and more easily obtained.

The Steppe pastures are in good order at the end of April, and by the begining of May the nomad camps have all begun to move. Those tribes whose lands border on the mountains drive their flocks thither and remain just under the snow line till July or even later, in spite of the occasional risk of plunder from the Kara-Kirghiz, the other great nomad tribe of Turkistan.

The return of spring is a time of general rejoicing in the Steppes, but autumn is the season for fêtes as well as for long migrations and "barantas" or raids, when the horses are in good condition after their summer feeding.

The animals bred by the Kazzáks are chifly Sheep and Camels but Sheep form the wealth of the tribe, a rich man sometimes owning as many as 20,000. The climate of the Steppe, frequented by the little horde is too severe for the Dromedary, but two-humped Carnels are used largely in the Orenburg trade and both varieties are extensively bred and used by the Kazzáks in the Southern part of the Steppe of the Great Horde.

The horses of the Kazzáks are of an active, enduring and hardy breed, much resembling those of the Ural Cossacks. They are more numerous in the Northern portion of the Steppe than in the Southern, the pasture and other conditions there being more favorable for breeding them. The Middle Horde are said to own more than the others, their studs containing from seven to ten thousand animals, usually kept in three divisions, foals, geldings and mares, and Stallions; each by themselves.

All sections of the Kazzáks indulge from time to time in the diversion of horse racing, especially on occasions of births, marriages and circumscisions and according to Schuyler, who was present at one of their meetings, the course is frequently from 10 to 20 miles in length. On such occasions sheep and sometimes horses are killed and cooked in large numbers, and men of neighbouring tribes will ride as much as 200 miles to be present at the festivities. Camel races are also not uncommon, the riders being frequently unmarried girls.

There are few horned Cattle to be found excepting among certain tribes of the Middle Horde. They are comparatively unprofitable and suffer too severely from the winter climate and from desease. Both horses and horned cattle suffer from rot, but sheep are generally unaffected by it. The Kazzáks have considerable veterinary skill, chiefly in the use of herbs, but their chief enemy is the winter which every year makes great ravages among their flocks, as it is impossible to find shelter for the vast number of animals.

Each tribe and section has a brand* by which they distinguish their own sheep and cattle.

Agriculture.—The practice of agriculture, notwithstanding that it is generally looked down upon as a less dignified occupation than cattle breeding, is increasing among the Kazzáks. This is in some cases undoubtedly a sign of advancing civilization and increased wealth, but is also due in many instances to the inferiority or small extent of the pasture lands belonging to various sections.

Should the present security for life and property among the nomads become permanent it is probable that their numbers will materially increase, which together with the occupation of the most inviting parts of their territory by Russian Colonists will further limit the area of their pasture grounds and, as in the case of the Bashkirs described by Mackenzie Wallace,† will force many of them to abandon their traditional mode of living in favor of agriculture.

At present agriculture is confined to the banks of the Syr and other rivers and lakes, but it seems probable that in bygone days it was carried on by the Kazzaks or their predecessors in parts of the Steppe where it would now be impossible, and dried up beds of lakes and rivers are met with in many places as well as signs of habitations‡ in spots now entirely destitute of water. Many of the present cultivators lead a nomad life between Seed-time and harvest. Their mode of irrigation is said to be very ingenious, but this as well as their knowledge of agriculture generally was probably borrowed from the Kará Kalpaks whom they supplanted on the Syr as well as from the settled populations of the Khanats of Bukhara and Khokand. Of cereals Barley, Wheat and Rye are to some extent grown but Millet which entails less labour is more frequently found, the latter yielding in good years from 50 to 60 fold while Barley and Wheat average only from 10 to 15. Melons and water-melons are also grown by many of the tribes. Their agricultural implements are rude, their practice being to tread out their grain with horses and cattle and to sow their land before ploughing it.

Weapons.—Regarding the weapons used by the Kazzaks we have interesting accounts by Stumm and also by Potto (Clarke's Steppe

* NOTE.—Many of these brands are now known to the Russian military and revenue officers who are thus able to identify the tribes to which small detached parties belong.

† "Russia" Vol II, page 49.

‡ It would be beyond the scope of this article to attempt to describe the traces that exist of cities and settled habitations generally in the Kazzík Steppe. None of these have ever been inhabited by the Kazzáks or by the direct ancestors of any of the present nomad races, though Levschine mentions that the Kará Kalpáks before their expulsion from the lower Syr occupied such buildings as were then standing among the ruins of Yangi-Kand.

The building of these towns, regarding which Loreh is the best authority, probably dates from the prosperous times of the "White Horde" who under the descendants of Juji peopled the lower Syr and the country lying to the east of the Karakum desert (Vide history.)

Campaigns). Both of these authorities speak of lances (*naita*) which Stenum says are formidable weapons and often nearly 20 feet long, the staff, as the name probably implies being frequently made of a stout cane or in some cases of Ash.

Fire arms are little used, their export from Russia into the Steppes being prohibited, and they seem to have no idea of the art familiar to Persian travellers of shooting from horse back. Very few of their carbines or pistols have percussion locks and being supplied to them as contrabaud articles by Russian and Jew contractors are probably more dangerous to the owners than to their enemies. Bows and arrows according to Potto have entirely gone out of use, but Stumm mentions them as formidable weapons and adds that slings and stones are also not to be despised in the hands of the Kazzáks. Daggers, often very richly ornamented, are carried by all ranks; their other weapons being curved Persian or sometimes European swords hung by a broad belt over the shoulder, a battle axe described by others as a hammer (*Ai-baltu*), a small axe on a straight handle, wooden clubs and thick whips (*Kamcha*).

The food of the Kazzáks is almost exclusively mutton, bread is unknown but when millet can be obtained it is sometimes made into a sort of porridge. Horse flesh is also eaten but generally only on occasions of festivity. Kumys* made of fermented mare's milk and Buza a beer brewed from Barley or other grain are their chief luxuries. But tea especially the coarsest and cheapest variety of brick tea is beginning to be popular. Game and fish† are not much appreciated as food by the Kazzáks nor do they in general care much for sport for its own sake. Some tribes however keep dogs for hunting as well as falcons, the species of the latter which is most esteemed being the golden eagle *fulco fulvus* or *Aquila chrysætos* (Lin) by means of which they kill foxes, hares, wolves, wild goats &c. Antelopes (*saigak*) and boars are taken by surrounding them and driving them upon staked nets planted in a semi circle. The tribes of the Ust-Yurt‡ also surround wild horses on the seashore and shoot them down with bows and guns; those which escape take to the water but return to the shore when exhausted and are there captured.

The only important industry among these people is the preparation of skins. They have also Blacksmiths, workers in Silver and Copper and Turners, but their productions are all coarse and without merit.

Their few wants are supplied chiefly by Russian traders in return for the produce in one form or other of their flocks and herds. They also import a certain amount of coarse cotton and other stuffs as well as arms from the countries to the South of them. The following figures

* Said to be identical with 'Camus' the fermented liquor given to the Romans in the camp of Attila.

† Lehmann.

‡ Levschine.

Each tribe and section has a brand* by which they distinguish their own sheep and cattle.

Agriculture.—The practice of agriculture, notwithstanding that it is generally looked down upon as a less dignified occupation than cattle breeding, is increasing among the Kazzáks. This is in some cases undoubtedly a sign of advancing civilization and increased wealth, but is also due in many instances to the inferiority or small extent of the pasture lands belonging to various sections.

Should the present security for life and property among the nomads become permanent it is probable that their numbers will materially increase, which together with the occupation of the most inviting parts of their territory by Russian Colonists will further limit the area of their pasture grounds and, as in the case of the Bashkirs described by Mackenzie Wallace,† will force many of them to abandon their traditional mode of living in favor of agriculture.

At present agriculture is confined to the banks of the Syr and other rivers and lakes, but it seems probable that in bygone days it was carried on by the Kazzaks or their predecessors in parts of the Steppe where it would now be impossible, and dried up beds of lakes and rivers are met with in many places as well as signs of habitations‡ in spots now entirely destitute of water. Many of the present cultivators lead a nomad life between Seed-time and harvest. Their mode of irrigation is said to be very ingenious, but this as well as their knowledge of agriculture generally was probably borrowed from the Kará Kalpaks whom they supplanted on the Syr as well as from the settled populations of the Khanats of Bukhara and Khokand. Of cereals Barley, Wheat and Rye are to some extent grown but Millet which entails less labour is more frequently found, the latter yielding in good years from 50 to 60 fold while Barley and Wheat average only from 10 to 15. Melons and water-melons are also grown by many of the tribes. Their agricultural implements are rude, their practice being to tread out their grain with horses and cattle and to sow their land before ploughing it.

Weapons.—Regarding the weapons used by the Kazzaks we have interesting accounts by Stumm and also by Potto (Clarke's Steppe

* Note.—Many of these brands are now known to the Russian military and revenue officers who are thus able to identify the tribes to which small detached parties belong.

† "Russia" Vol II, page 49.

‡ It would be beyond the scope of this article to attempt to describe the traces that exist of cities and settled habitations generally in the Kazzák Steppe. None of these have ever been inhabited by the Kazzaks or by the direct ancestors of any of the present nomad races, though Levschine mentions that the Kará Kalpaks before their expulsion from the lower Syr occupied such buildings as were then standing among the ruins of Yangi-Kand.

The building of these towns, regarding which Loreh is the best authority, probably dates from the prosperous times of the "White Horde" who under the descendants of Juji peopled the lower Syr and the country lying to the east of the Karakum desert (Vide history.)

who had been cut off and entirely destroyed by this same tribe. The Adai then attacked the fort and made themselves masters of the chief outworks containing the bazar and some barrack buildings. The Garrison were falling short of ammunition and the place would certainly have been taken had it not been for the opportune arrival of a steamer containing re-inforcements from the Caucasus.

Most of this tribe feed their flocks in the Ust-Yurl and in the Mangishlak prefecture of the trans-Caspian district but a few sections who have abandoned the nomad life in favor of agriculture pass the winter on the lower course of the Einba. The breed of horses used by this tribe greatly excels those of the other Kazzaks in power and symmetry. The Adai Kazzaks were reduced to submission shortly after the events above narrated and have since paid tribute more or less regularly to Russia. They again gave some trouble in the Mangishlak peninsula in 1873, but were quickly suppressed,

AUTHORITIES, *Levschine, Arasanski, Michel, Major Wood R. E. D'Kerbelot, Lehnunn, Khunikof, Radloff, Schuyler, Lerek, Clarke's steppe campaigns, Stumm, Schmidt, Ujfalvi, &c.*

shewing the export trade in 1869, from the Kazzák Steppes are taken from Schuyler.

<i>To Orenburg and Troitsk.</i>	<i>To Petro Pavloisk from 1856-65.</i>
Camels 1,150 head	Cattle of various sorts £ 340,000,
Horses 1,001 "	per annum
Horned Cattle 16,031 "	Leather and Hides £ 55,000,
Sheep 273,823 "	per annum
Total value £ 200,000	

The personal appearance* of the Kazzáks indicated a combination between the Mongol and Turk races, the former predominating especially among the Aristocratic classes, a fact partly explained by their preference, at least in former days for Kalmuk women over their own. This however arose if not so much from taste as from the circumstance that the former could be carried off by raids upon the Zunghars or the Kalmuks of the Volga whereas they had to pay the 'Kalym' for a wife among their own people. The Kalmuk type is said to be stronger in the women than in the men their hair being generally blacker and their eyes small.

Both sexes are strongly built and of middle height; those of the middle horde being somewhat taller than the others.

The language of the Kazzáks is a pure Tatar dialect according to Schuyler's account peculiarly free from foreign elements. It is not quite clear from Vambery's Cagataische Sprachstudien whether he considers that their language should be referred to the Chagathai or Turkuman "tilis" (dialects) of Eastern Turki, but he differs from Schuyler as to its purity saying that it contains many non-Turkish words, expressions and grammatical forms. Russian Officers in Government employ are as a rule profoundly ignorant of the languages of the Nomads, and several of them in reports of which we have translations speak of the Kazzák dialect as a corrupt form of Turkish on account of its containing many words unintelligible to a Stambouli Turk or to a Kazac or Orenburg Tatar. The most trustworthy authority is probably professor Radloff who classes the Kazzák as the purest dialect of Turkish, the next purest being that of the Kará-Kalpáks and after them that of the Turkomans. The Adai section of the Central Hordo of Kazzáks known to the Russians as the Adaieff Kirghiz are mentioned as worthy of separate notice. They are distinguished from the remainder of the tribe by their superior valour and are the only nomads who have ever made a serious attack on a Russian Steppe fort. This event took place in March 1871, when the Garrison of Fort Alexandrovsk on Cape Tuk-Karághan in the Mangishlak prefecture, had been reduced by the loss of a party of 40 Cossacks under Col. Rukin

* According to Vambery the Mongol type of face is held by the Kazzáks to be the most perfect form of human beauty from the fact that "God has made it with prominent bones like those of the horse" which animal they consider the crowning work of creation.

who
Adai
outw
Garri
have
conta

Mang
who
on th
great
Adai
narra
They
but v

*D'Ke
stepp*

V.

VARIOUS DESCRIPTIONS OF TRANSPORT.

BY

BREVET MAJOR G. A. FURSE, 42ND ROYAL HIGHLAND REGIMENT.

(Continued from No. 32.)

Stores, supplies, *materiel*, &c., can be conveyed—

- 1st. By railway.
- 2nd. By wheel carriage or pack animals on ordinary routes.
- 3rd. By carriers.
- 4th. By vessels on lakes, rivers, or canals.
- 5th. By sea in steam vessels or sailing ships.

There are various descriptions of Land Transport suitable for an army; of these, the most susceptible of order, and most suitable to the country in which operations are to be carried out, should be chosen in preference to all others to accompany the troops; the other kinds will always be useful for working on the line of communication in rear.

In several of our wars and expeditions, but principally in those Carriers. in China, Abyssinia, Looshai, Ashantee, and Duffla, carriers have been largely, if not entirely, used as Military Transport.

Not only in India, but in many other countries, the entire carriage of the sick and wounded has been performed by carriers.*

The French have used for many years light companies (*compagnies légères*) with mules for the carriage of the sick and wounded. These are attached to the ambulances, and have the advantage of being able to follow the combat everywhere, on ground impracticable for wheel-

* For the conveyance of the sick and wounded by carriers, dhoories, hammocks, cots, and dhandies are used. The common Indian Army dhoorie weighs 120 lbs.; admirable for the plains, it is ill adapted for hilly countries, and difficult to pack on board ship. The hammock is either a common ship hammock, as used on the Gold Coast, or one of MacGuire's field hammocks, as used in Abyssinia, lashed to a pole or bamboo. MacGuire's is the lightest, and weighs with pole about 24 lbs. Hammocks get baggy in the centre, and the patient is made uncomfortable by the body being bent, and its weight being thereby unfairly distributed. A swinging cot has most of the advantages of the dhoorie and the lightness of the hammock; it weighs about 54 lbs., packs easily, and is good for bad roads and hilly country. Both the hammock and the swinging cot have no legs like the dhoorie, and cannot be laid on wet ground. In Ashantee, where wood was plentiful, tripod stands were made at the resting-places, and the poles of hammocks and cots were rested on these; there the above disadvantage, except when a rest was required on the line of march, disappeared. The dhandie is more suitable than the dhoorie for hilly country; it weighs from 46 to 54 lbs., but generally has no cover to protect the occupant from the sun or rain. Surgeon-Major Isidore Bourke showed a very ingenious dhoorie at the Imperial Durbar Camp at Delhi in 1877. It was light, easily packed, easily repaired, cheap, and lasting; besides other advantages, it could be used as a stretcher, as a mule or camel litter, as an hospital cot, as a swing cot in a railway wagon, on board ship, and in an ambulance cart.

carriages removing the wounded from the battle-field to the ambulance wagons kept further in rear.

Carriers have different ways of carrying loads; some carry entirely on the head, a general custom in most parts of Africa; some carry on the back, as with the hill coolies in India; with others a load is divided between two or more men, who carry it pending from a pole or bamboo. In some parts of India and in China coolies carry heavy loads suspended from the two ends of an elastic piece of bamboo.

As a general rule, in hilly countries men will be found to carry their burdens on the back, and in flat countries on the head. How the loads are carried is immaterial; if the men are permitted to choose their own way, they will adopt the one they are accustomed to, and will thus do their task much more easily.

In the China and Ashantee Wars the weight of a load for each carrier was 50 lbs., but it seldom came fully up to that. Some use was made of women carriage in the last place, and these hardworking creatures carried the same weight as the men, with the addition generally of a child on the back, and did their work very cheerfully.

In the Looshai and Duffla Expeditions the weight of a load was 40 lbs. The steep and slippery state of the roads ought always to be taken into account in fixing the amount of weight each man has to carry.

Stores require to be made up as much as possible in uniform weights, which will materially help in loading. Packages of particular shapes are better balanced and more easily carried than others. On the Gold Coast, tea, flour, rice, and preserved provisions were carried in boxes, salt meat in conical tubs, and biscuits* in bags. The carriers preferred the conical tubs to any other load.

Carriers have the disadvantage of occupying a great space on the line of march and of requiring strong escorts. The mates and other superintendents, not carrying loads, should always be armed, and should form part of the escort. Carriers have their own kit to carry in addition to their loads; and in some countries blankets, waterproof sheets, spare clothing, &c., are indispensable to keep the men in health. This last disadvantage will disappear when staging operations can be introduced—a system which will be found always to answer best both with men and animals.

Corps of carriers will come in very useful at the port of debarkation, and at the principal depôts on the line of communication, for unloading

* In countries liable to a sudden downpour of rain, biscuit is liable to get damaged if carried in bags. Where loads, besides, are continually taken up and put down, the biscuit is much broken and reduced to dust, and the weight of each bag soon gets lessened; the bag gets torn and broken, and the carriers, as was often the case on the Gold Coast, help themselves freely.

stores from board ship, loading wagons, trains, clearing wharfs, &c.; a properly organized body would greatly facilitate and quicken the work at such places.

Pack animals are generally used in hilly countries, where bad and difficult roads abound. In determining the weight to be carried by pack animals, the minimum weight should be considered in preference to the maximum. The weight carried by pack animals is a dead weight, and on long marches, with long periods of waiting, very trying and fatiguing to the animals.* Among a large number of animals suddenly brought together there will be many inferior ones, on whom poor food and continuous hard work will soon tell.

For horses and mules the weight to be carried is generally given at 200 lbs., pack saddle included. In the Abyssinian Expedition the load carried by mules had to be reduced to 100 lbs., not including the pack saddle. It may be assumed as a rule that from 150 to 160 lbs., in addition to the saddle, is a fair weight for pack animals doing continuous work on inferior roads.

Pack transport was extensively used by the British Army in the Peninsula, but of all transport it is acknowledged to be the most troublesome and difficult to arrange; Pack animals require a large number of men to attend on them and the further an army gets from its base of operations the less stores the animals actually carry, as a good deal of their load will consist in food for themselves and drivers. They cannot be unloaded at every halt, are more difficult to load and more liable to sore backs and to strains. Pack animals have besides, the great disadvantage of lengthening out considerably the column on the march. Occasions will, however, occur where most of the transport must be of this description.

The animals used are horses, ponies, mules, donkeys, camels, bullocks, elephants.

The horse amongst us is too well known to demand a special notice, though he is not generally used by us as an animal of burden. Horses for this purpose, should be strong, compact animals, between 14-2 and 15 hands in height.

Mules are of two kinds; the cross between the ass and the mare, which are the most valuable, and that between the horse and the she-ass, which are small and valueless. Those of the first kind bray, whereas those of the

* When pack animals are loaded before a regiment marches off, in cases where the baggage is not to follow immediately, the animals may be loaded for one or more hours before they are actually put in motion.

second neigh. Some breeds are of very great size and singular beauty, amongst others those of Andalusia are quite celebrated. The large and handsome ones are reserved for the saddle and the smaller and less showy animals are employed to carry burdens. Mules can be worked from four to twenty five years of age, and even more; their common height ranges from 13 to 15½ hands.

Mules are hardy, sure-footed animals and in mountainous countries are more useful than horses, being capable of carrying equally heavy burdens and enduring long-continued fatigue. This animal has some excellent qualities; he is strong, frugal, slightly affected by the heat, is easily fed, and equally good for burden and for draught. He is long-lived and seldom sick, he is easily alarmed by the noise of firing.

Female mules are best, as they are very docile and well adapted for burden. Entire mules are vicious and carry loads badly. None under four or over seven years of age should be purchased. In the Peninsular War and in Abyssinia mules were extensively used as pack animals, and in the Crimean War they were used in the Land Transport Corps for draught. In India they form part of the permanent transport of the Punjab Irregular Force, and are used as pack animals in the mountain batteries. They have also been largely used in the many expeditions which have taken place on the North-Western Frontier.

The mules for the Crimean Land Transport Corps were purchased in the Levant and Spain; those for Abyssinia came from various countries, such as Spain, Syria, Egypt, Persia, India; and Abyssinia itself supplied a small number. Of all these, the Spanish ones did not answer as pack animals, though some did good service in harness. They were badly bred, and soon fell into low condition when the dry and coarse forage of the country replaced the fresh grass they had been accustomed to.

The animals from Egypt, Syria, Persia and India, thriving on little grain and coarse grass, were more hardy and more enduring. Those purchased for the Lahore Mule Train for service in Abyssinia came from the Punjab districts, from Jhelum to Kurnal, and from Simla to Sirsa. The Sikhs, Pathans, and Farsewans of the travelling Afghan tribes, as also the Koomiars of the Punjab, make good muleteers.

Driving mules has been found to answer better than leading, particularly on bad roads and mountain tracks. The animals will follow the leading one and the sound of his bell more freely than if tied head to tail together in batches.

Mules have dainty habits about drinking water; they will often not drink good water out of a brook which has been muddied by other animals.

Harness for mules requires to be strong and well made. A mule pad weighs about 34 lbs., and complete with saleeta bags and loading ropes the weight comes up about 48 lbs.

Pack ponies are nearly as good as mules for transport purposes, Ponies. but the saddles for them should be made to fit them carefully in the first instance. In the Native Cavalry in India very small and badly-bred ponies are used to carry the kit of the troopers on the march, and provide the horses with grass when in cantonments; these poor animals, badly fed and looked after, make very long marches with heavy loads, and come into camp generally not long after the arrival of the regiment.

Those from the hill districts in India are very good ; they should be driven as recommended with mules.

Colonel Haly in his pamphlet on the Abyssinian expedition says : " I would strongly recommend the Pegu pony. These high-bred, plucky, fast, and docile little animals are first-rate in draught, and will carry as heavy a weight as the largest horse ; and as they horsed the mountain train attached to the Malabar Police Corps when under my command, I can speak with certainty as to their fitness for that work."

Donkeys are capital animals for transport if not worked too young Donkeys. and if of good size and breed ; they are very enduring, do not require much food, and four or five can be placed in charge of one man.

The ass is sure-footed and easily maintained. The Spanish is double the size of the ordinary English ; as a general rule, the ass is large and sleek-haired in warm countries, small and woolly-haired in colder ones. Asses are used more in the East for carrying burdens and for saddle than in Europe.

The load for a donkey should not exceed 100 lbs., and none under four years of age should be purchased for service.

Camels are used in India more than any other animal for Military Transport service. There are two species of this animal—the common or Arabian camel, which has one hump, and is now largely domesticated in India ; and the Bactrian, which has two humps. The Arabian is the more valuable of the two, and can store up a considerable amount of water for future use. Once accustomed to journey across the arid and sandy deserts and wastes, experience teaches him to lay by a greater supply of water than could be accumulated by a young and untried animal. A large camel of this kind, taking five or six gallons of water into his stomach, can exist five or six days without drinking. Camels receive

carriages removing the wounded from the battle-field to the ambulance wagons kept further in rear.

Carriers have different ways of carrying loads; some carry entirely on the head, a general custom in most parts of Africa; some carry on the back, as with the hill coolies in India; with others a load is divided between two or more men, who carry it pending from a pole or bamboo. In some parts of India and in China coolies carry heavy loads suspended from the two ends of an elastic piece of bamboo.

As a general rule, in hilly countries men will be found to carry their burdens on the back, and in flat countries on the head. How the loads are carried is immaterial; if the men are permitted to choose their own way, they will adopt the one they are accustomed to, and will thus do their task much more easily.

In the China and Ashantee Wars the weight of a load for each carrier was 50 lbs., but it seldom came fully up to that. Some use was made of women carriage in the last place, and these hardworking creatures carried the same weight as the men, with the addition generally of a child on the back, and did their work very cheerfully.

In the Looshai and Duffla Expeditions the weight of a load was 40 lbs. The steep and slippery state of the roads ought always to be taken into account in fixing the amount of weight each man has to carry.

Stores require to be made up as much as possible in uniform weights, which will materially help in loading. Packages of particular shapes are better balanced and more easily carried than others. On the Gold Coast, tea, flour, rice, and preserved provisions were carried in boxes, salt meat in conical tubs, and biscuits* in bags. The carriers preferred the conical tubs to any other load.

Carriers have the disadvantage of occupying a great space on the line of march and of requiring strong escorts. The mates and other superintendents, not carrying loads, should always be armed, and should form part of the escort. Carriers have their own kit to carry in addition to their loads; and in some countries blankets, waterproof sheets, spare clothing, &c., are indispensable to keep the men in health. This last disadvantage will disappear when staging operations can be introduced—a system which will be found always to answer best both with men and animals.

Corps of carriers will come in very useful at the port of debarkation, and at the principal depôts on the line of communication, for unloading

* In countries liable to a sudden downpour of rain, biscuit is liable to get damaged if carried in bags. Where loads, besides, are continually taken up and put down, the biscuit is much broken and reduced to dust, and the weight of each bag soon gets lessened; the bag gets torn and broken, and the carriers, as was often the case on the Gold Coast, help themselves freely.

stores from board ship, loading wagons, trains, clearing wharfs, &c.; a properly organized body would greatly facilitate and quicken the work at such places.

Pack animals are generally used in hilly countries, where bad and difficult roads abound. In determining the weight to be carried by pack animals, the minimum weight should be considered in preference to the maximum. The weight carried by pack animals is a dead weight, and on long marches, with long periods of waiting, very trying and fatiguing to the animals.* Among a large number of animals suddenly brought together there will be many inferior ones, on whom poor food and continuous hard work will soon tell.

For horses and mules the weight to be carried is generally given at 200 lbs., pack saddle included. In the Abyssinian Expedition the load carried by mules had to be reduced to 100 lbs., not including the pack saddle. It may be assumed as a rule that from 150 to 160 lbs., in addition to the saddle, is a fair weight for pack animals doing continuous work on inferior roads.

Pack transport was extensively used by the British Army in the Peninsula, but of all transport it is acknowledged to be the most troublesome and difficult to arrange; Pack animals require a large number of men to attend on them and the further an army gets from its base of operations the less stores the animals actually carry, as a good deal of their load will consist in food for themselves and drivers. They cannot be unloaded at every halt, are more difficult to load and more liable to sore backs and to strains. Pack animals have besides, the great disadvantage of lengthening out considerably the column on the march. Occasions will, however, occur where most of the transport must be of this description.

The animals used are horses, ponies, mules, donkeys, camels, bullocks, elephants.

The horse amongst us is too well known to demand a special notice, though he is not generally used by us as an animal of burden. Horses for this purpose, should be strong, compact animals, between 14-2 and 15 hands in height.

Mules are of two kinds; the cross between the ass and the mare, which are the most valuable, and that between the horse and the she-ass, which are small and valueless. Those of the first kind bray, whereas those of the

* When pack animals are loaded before a regiment marches off, in cases where the baggage is not to follow immediately, the animals may be loaded for one or more hours before they are actually put in motion.

second neigh. Some breeds are of very great size and singular beauty, amongst others those of Andalusia are quite celebrated. The large and handsome ones are reserved for the saddle and the smaller and less showy animals are employed to carry burdens. Mules can be worked from four to twenty five years of age, and even more; their common height ranges from 13 to 15½ hands.

Mules are hardy, sure-footed animals and in mountainous countries are more useful than horses, being capable of carrying equally heavy burdens and enduring long-continued fatigue. This animal has some excellent qualities; he is strong, frugal, slightly affected by the heat, is easily fed, and equally good for burden and for draught. He is long-lived and seldom sick, he is easily alarmed by the noise of firing.

Female mules are best, as they are very docile and well adapted for burden. Entire mules are vicious and carry loads badly. None under four or over seven years of age should be purchased. In the Peninsular War and in Abyssinia mules were extensively used as pack animals, and in the Crimean War they were used in the Land Transport Corps for draught. In India they form part of the permanent transport of the Punjab Irregular Force, and are used as pack animals in the mountain batteries. They have also been largely used in the many expeditions which have taken place on the North-Western Frontier.

The mules for the Crimean Land Transport Corps were purchased in the Levant and Spain; those for Abyssinia came from various countries, such as Spain, Syria, Egypt, Persia, India; and Abyssinia itself supplied a small number. Of all these, the Spanish ones did not answer as pack animals, though some did good service in harness. They were badly bred, and soon fell into low condition when the dry and coarse forage of the country replaced the fresh grass they had been accustomed to.

The animals from Egypt, Syria, Persia and India, thriving on little grain and coarse grass, were more hardy and more enduring. Those purchased for the Lahore Mule Train for service in Abyssinia came from the Punjab districts, from Jhelum to Kurnal, and from Simla to Sirsa. The Sikhs, Pathans, and Farsewans of the travelling Afghan tribes, as also the Koomiars of the Punjab, make good muleteers.

Driving mules has been found to answer better than leading, particularly on bad roads and mountain tracks. The animals will follow the leading one and the sound of his bell more freely than if tied head to tail together in batches.

Mules have dainty habits about drinking water; they will often not drink good water out of a brook which has been muddied by other animals.

Harness for mules requires to be strong and well made. A mule pad weighs about 34 lbs., and complete with saleeta bags and loading ropes the weight comes up about 48 lbs.

Pack ponies are nearly as good as mules for transport purposes, Ponies. but the saddles for them should be made to fit them carefully in the first instance. In the Native Cavalry in India very small and badly-bred ponies are used to carry the kit of the troopers on the march, and provide the horses with grass when in cantonments; these poor animals, badly fed and looked after, make very long marches with heavy loads, and come into camp generally not long after the arrival of the regiment.

Those from the hill districts in India are very good ; they should be driven as recommended with mules.

Colonel Haly in his pamphlet on the Abyssinian expedition says : " I would strongly recommend the Pegu pony. These high-bred, plucky, fast, and docile little animals are first-rate in draught, and will carry as heavy a weight as the largest horse; and as they horsed the mountain train attached to the Malabar Police Corps when under my command, I can speak with certainty as to their fitness for that work."

Donkeys are capital animals for transport if not worked too young Donkeys. and if of good size and breed ; they are very enduring, do not require much food, and four or five can be placed in charge of one man.

The ass is sure-footed and easily maintained. The Spanish is double the size of the ordinary English ; as a general rule, the ass is large and sleek-haired in warm countries, small and woolly-haired in colder ones. Asses are used more in the East for carrying burdens and for saddle than in Europe.

The load for a donkey should not exceed 100 lbs., and none under four years of age should be purchased for service.

Camels are used in India more than any other animal for Military Transport service. There are two species of this animal—the common or Arabian camel, which has one hump, and is now largely domesticated in India ; and the Bactrian, which has two humps. The Arabian is the more valuable of the two, and can store up a considerable amount of water for future use. Once accustomed to journey across the arid and sandy deserts and wastes, experience teaches him to lay by a greater supply of water than could be accumulated by a young and untried animal. A large camel of this kind, taking five or six gallons of water into his stomach, can exist five or six days without drinking. Camels receive

no injury to their palate from the thorns and hard food they eat, and their feet are well adapted to maintain a firm hold of the shifting sand. The Bactrian camels require liquid every third day.

Unlike the non-humped camel, the Bactrian species is quite at home in a cold climate, and walks over ice as easily as its congener does over smooth stone. It is an admirable rock-climber, and is said even to surpass the mule in the sureness of its tread. This quality is probably occasioned by the peculiar structure of the foot, which has an elongated toe projecting beyond the soft pad, and forming a sort of claw. In the winter time the riders much prefer them to horses, because their long legs enable them to walk easily through snow, in which a horse could only plunge helplessly, and would in all probability sink and perish.

A mixed breed of the one humped and the Bactrian animals is thought to be the best for hill work in winter time, and General Harlan actually took two thousands of these animals in winter time for a distance of three hundred and sixty miles over the snowy tops of the Indian Caucasus; and though the campaign lasted for seven Months, he only lost one Camel, and that was accidentally killed. Owing to its use among the hills, the Bactrian species is sometimes called the Mountain Camel.

The mixed breed which has just been mentioned must be procured from a male Bactrian and a female Arabian Camel. If the parentage be reversed, the offspring is useless being, ill-tempered, and disobedient. The Bactrian Camel is, as has been mentioned, tolerant of cold, and is indeed so hardy an animal that it bears the severest winters without seeming to suffer distress, and has been seen quietly feeding when the thermometer has reached a temperature several degrees below zero. Sometimes, when the cold is more than usually sharp, the owners sew a thick cloth round its body, but even in such extreme cases the animal is left to find its own food as it best can. And, however severe the weather may be, the Bactrian Camel never sleeps under a roof. (Rev. J. G. Wood's, *Bible Animals*.)

The ordinary height of a camel is from six to seven feet at the shoulder; the highest speed of a lightly-loaded animal is three miles per hour, but as a general rule it does not amount to more than $2\frac{1}{2}$ miles. A heirie, or swift camel, seldom does more than eight miles per hour, but the animal is so enduring as to keep up this pace for a period of many hours.* The stride of a camel varies from 6' 6" to 7' 6"; he is a bad mover over stony or wet ground: in the first he soon gets foot-sore; in the second he cannot obtain a secure hold of the ground—he either falls, or his legs separating widely apart cause him fatal injury.

* In riding long stages on a very fast camel it will be found a great comfort for the rider to wear a wide roll of cloth, or *cummerbund*, tightly wound round the waist for support.

leaders and driven by small Hottentots using enormous bamboo whips eighteen to twenty feet in length; in the war in New Zealand, two-wheeled carts used, with one horse in the shafts and a second horse leading; in the American War, long wagons drawn by six horses or mules, and driven by one man mounted on the near wheeler. As countries differ greatly from each other, their nature and general state of the roads alone can determine the most appropriate kind of wheeled transport suitable for each. All carts, wagons, &c., particularly those for use in the East, where the animals as a rule are much smaller than at home, should be of a light description—strong, no doubt, but never of such cumbersome construction as to conduce to waste of strength in the cattle required to draw them. If made much after the pattern of those in use in the country itself, and horsed in the same way, they will be found generally to answer well.

The adoption of one pattern carriage alike for all services, which has been advocated by some writers abroad, is impossible, on account of the variety of uses carriages are put to. One of the arguments in favour of this measure is the supposed advantage of being able to utilize the empty carriages of every service for any purpose on a sudden contingency arising; but the transferring of transport carriages from one service to another would lead to serious results, as it would cause confusion, and would tend to disorganize, for a longer or shorter period, that portion of the Army which has been deprived of its carriage. At first sight, it appears that horses might with advantage be changed during the progress of a war, so that those which have for some time drawn heavy loads might be transferred to lighter ones, and thus suffer a lesser strain on their constitutions. In practice this has not been found to work well; and it is not advisable to shift them from one section to another. Empty carriages returning to the rear may and have been frequently used to remove sick and wounded. Some of these are without cover or protection from sun and rain; others are without springs, and therefore unsuitable for this purpose; but necessity knows no law, and necessity at times compels their use.

With carriages what is principally required is that they should be light, the dead weight being reduced to a minimum, and the horses should be led by drivers and not by riders. With regard to this last point, the system of having a rider for each pair of horses is nothing less than a waste of power in transport, where the horses are neither required to go at the pace Artillery are required to move at, nor to pass over every description of ground. The near horses have enough of work to do in carrying the rider, and are of little real assistance in drawing. This style of driving with postilions is never met with in the ordinary carriage of any country. Why should it be retained in the transport of any army, where more economy of power is needed?

"The general carriage of the country in which an army is campaigning should be used as much as possible, not only because it can be more easily replaced, but likewise that it is generally more suited to

no injury to their palate from the thorns and hard food they eat, and their feet are well adapted to maintain a firm hold of the shifting sand. The Bactrian camels require liquid every third day.

Unlike the non-humped camel, the Bactrian species is quite at home in a cold climate, and walks over ice as easily as its congener does over smooth stone. It is an admirable rock-climber, and is said even to surpass the mule in the sureness of its tread. This quality is probably occasioned by the peculiar structure of the foot, which has an elongated toe projecting beyond the soft pad, and forming a sort of claw. In the winter time the riders much prefer them to horses, because their long legs enable them to walk easily through snow, in which a horse could only plunge helplessly, and would in all probability sink and perish.

A mixed breed of the one humped and the Bactrian animals is thought to be the best for hill work in winter time, and General Harlan actually took two thousands of these animals in winter time for a distance of three hundred and sixty miles over the snowy tops of the Indian Caucasus; and though the campaign lasted for seven Months, he only lost one Camel, and that was accidentally killed. Owing to its use among the hills, the Bactrian species is sometimes called the Mountain Camel.

The mixed breed which has just been mentioned must be procured from a male Bactrian and a female Arabian Camel. If the parentage be reversed, the offspring is useless being, ill-tempered, and disobedient. The Bactrian Camel is, as has been mentioned, tolerant of cold, and is indeed so hardy an animal that it bears the severest winters without seeming to suffer distress, and has been seen quietly feeding when the thermometer has reached a temperature several degrees below zero. Sometimes, when the cold is more than usually sharp, the owners sew a thick cloth round its body, but even in such extreme cases the animal is left to find its own food as it best can. And, however severe the weather may be, the Bactrian Camel never sleeps under a roof. (Rev. J. G. Wood's, *Bible Animals*.)

The ordinary height of a camel is from six to seven feet at the shoulder; the highest speed of a lightly-loaded animal is three miles per hour, but as a general rule it does not amount to more than $2\frac{1}{2}$ miles. A heiree, or swift camel, seldom does more than eight miles per hour, but the animal is so enduring as to keep up this pace for a period of many hours.* The stride of a camel varies from 6' 6" to 7' 6"; he is a bad mover over stony or wet ground: in the first he soon gets foot-sore; in the second he cannot obtain a secure hold of the ground—he either falls, or his legs separating widely apart cause him fatal injury.

* In riding long stages on a very fast camel it will be found a great comfort for the rider to wear a wide roll of cloth, or *cummerbund*, tightly wound round the waist for support.

Camels can carry a load of from 300 to 400 lbs., according to their size. They are cheap to maintain, are easily fed and managed; they are, however, difficult to transport by sea, are delicate animals,* and require careful looking after and doctoring. Young camels are unfit for rough work. The lowland camel cannot stand the severe climate of cold countries, and, *vice versa*, the hill camel suffers a good deal from the heat of the plains. The great mortality amongst camels in the Afghan campaign, in Scinde, and in Abyssinia was principally due to this fact, and to many, in the first, having been poisoned by feeding on the oleander bush.

In the expedition to Afghanistan of 1839 the army lost in the march from Ferozepore to Candahar no less 20,000 animals. Most of the transport animals for the expeditionary force were lowland camels —about the worst possible animals to use with an army in the front at all times, but especially when operations were to be carried out in a cold and hilly country. As a baggage animal in a plain country, working between depôts or with reserves, the camel is invaluable, but certainly ill suited at all times to accompany an army making long and rapid marches, for which purpose mules and ponies are very much preferable.

An officer who accompanied Sir Richard England's column in its march through the Bolan Pass to Quetta, Moostung, and Khelat describes the transport arrangements for that column as follows:— “The transport was partly hired and partly purchased by the Commissariat Department. Camels only were used, a certain number of which were attached to corps whose Commanding Officer told off a small party to look after them under the general superintendence of the Quarter Master. Convoys coming through the Bolan with Commissariat supplies were looted, and, one way or other, from want of military organization and system, it was found at the end of a year, or a little more, that out of 10,000 camels which had been purchased by the Commissariat, very few remained. The order was that, if a camel died *en route*, the Commissariat Conductor, or other subordinate in charge, should bring in either the tail or the mark (which was burnt on the neck), as a proof of the fact; and the result was that heaps of tailless camels, &c., were afterwards found amongst the people of the country, our people having abandoned them because a little tired, and swore they are dead; or perhaps they had sold them.”

Sir W. Nott gives the number of camels that accompanied the 10,000 men to Afghanistan as having amounted to 30,000. Campaigning in a cold climate like that of Afghanistan, there is no reason why the troops should not return to their European habits of attending entirely to their own wants and carrying their kits; the cumbersome Indian tents might be replaced by a lighter and more portable article,

* “ The treatment of sick camels appears to be little understood.” (Sir C. Napier.)

and the reduced baggage carried entirely by good strong ponies and mules.

Napoleon formed a dromedary corps for his expedition to Syria. Following his example, when Sir Charles Napier found himself at the head of an army in Scinde (a country well adapted for camels), he raised a camel corps, which was revived during the latter part of the Indian Mutiny, and did good service in the Central India campaign. Each camel carried a driver and an infantry soldier. The camel corps could make very long marches, at the end of which the soldier, comparatively fresh, could dismount and fight on foot; it was therefore impossible, even for the lightest troops, to try and escape.

The camels attacked by superior numbers could form a ring, facing inwards, and the drivers, who were also armed, could keep the enemy off from behind this living redoubt. The camels carried the man's things, bedding, provisions, &c., which rendered the corps free and independent. The weight of a double camel saddle is about 133 lbs.

The following extract from Sir C. Napier's *Administration of Scinde* shows how very useful a camel corps can become on an emergency:—"No sumpter camels had yet been procured, and the General, thus pushed to the wall, detached Fitzgerald's fighting camel corps to fetch food from Shahpoor, with orders to scour the ravine of Tonge once more during his march, and even to attack that place if it contained enemies. The military excellence and power of this anomalous corps were then strikingly shown. With hired sumpter camels the marches alone would have occupied sixty days and nights; and a strong escort must have been employed to protect the convoy. Fitzgerald's men, self-supported as a military body, not only scoured the ravine and reached Shahpoor in one night, after a march of fifty miles, but loaded their camels with 45,000 pounds of flour and regained camp on the morning of the 8th, having employed but three days and two nights in the whole expedition!"

Camels have also been used to convey reinforcements rapidly on an emergency, two men riding one on each side in *kajawahs*, which are large square boxes with a wooden framework, about $4\frac{1}{2}$ ft. long by $3\frac{1}{2}$ ft. broad; the sides of this framework being covered with gunny cloth or rope matting. Sick men have been carried in *kajawahs*; but the motion of the animal forwards and backwards at every step he takes makes it very uncomfortable for sick men.

Another, however, and a very important use to which camels have been put, is the forwarding of letters and despatches by riding camels. These animals will trot seven and more miles an hour on fair roads, and will go for many miles without showing any signs of distress. Most corps of Native Cavalry in India are provided with one or more Shooter Sowars per troop for this duty.

Light field-pieces are also carried on camels, four animals being told off to each gun—one for the piece, one for the iron carriage, one for the wheels, loading rods, &c., and the last for a pair of ammunition boxes.

With the army of the Indus there was a field battery of 9-poundsers drawn by camels, and Sir Charles Napier in his march to Emaumghur had also a camel battery with his force. A particular description of animal called the *baugree* is employed for draught. The first battery was raised by Major Pew, Bengal Artillery. Four camels were attached to each gun and limber; but it was suggested in the Afghan campaign, where the battery was first used on service and found to work well, to have six camels for each gun and limber, and to carry the ammunition on pack camels and not in tumbrils.

These various uses to which camels have been put do not strictly come under the head of transport, but are mentioned here to show how very useful these animals can be made in countries suited to their movements. The advantages they possess in such countries are, that they can go longer without water than the horse or mule; in most of these they are easily fed, and no forage has to be carried for them, and they do not suffer from extreme heat.

The weight of their equipment, consisting of baggage saddle, saleeta bags, and ropes, amounts to about 48 lbs.

Bullocks are used for draught as well as for pack; for the first their movements are very slow, their pace hardly exceeding $1\frac{1}{2}$ mile per hour. Pack bullocks will carry about 160 lbs., moving with that load at the rate of 2 miles per hour. When bullocks are used in draught they are found to pull better in swampy countries and have more endurance than any other animals.

The Duke of Wellington in his campaigns in India, at the commencement of this century, had most of his transport done by pack bullocks; but his despatches are full of complaints against the Brinjarees* who supplied him with cattle, and go clearly to show on what a precarious transport his military operations were carried out, as the men, though well treated, broke their engagements with him, sold the stores confided to them, and deceived him in every instance.

Bullocks are much used in some parts of India as pack animals, but are not desirable as military transport, as they soon fall into bad condition if not supplied with abundance of food and water. The animals will straggle in search of forage, and cause thereby serious inconvenience on the line of march.

* The Brinjarees are a special caste of carriers in India, generally from Bundelkund: their occupation is conveying large quantities of grain by means of pack bullocks all over the country.

TRANSPORT OF ANIMALS

BY SEA TO PORT OF DEBARKATION.

Owing to the peculiarity of our insular position, all our wars and expeditions take place far away, some thousands of miles from England. In the East also our most important expedition are not generally those sent across the frontier, but the ones fitted out in India for service in some distant country. It follows from this that we have either to organize a Transport Corps on landing in an enemy's country, or in that of an ally we desire to protect and defend or else we have to organize one at home, in India or elsewhere, and forward it to the seat war.

Always, when possible, it will be the best plan to organize one previous to its being despatched to the seat of war; there the services of such a corps will be immediately required, and a previously organized one will, after landing, be available for almost immediate work.

To provide against loss of animals on the passage, and for all being landed in a fit state for work, certain arrangements are necessary, and the following appear to be the ones demanding particular attention :—

A commandant and staff sufficient for all requirements should be established at the port of embarkation, or wheresoever the transport dépôt is formed, where the animals and *materiel* would in the first instance be assembled, where the corps would be organized, and thence forwarded to its destination.

Contracts for animals and equipment may be entered into in any of the neighbouring markets, but every article for the transport should be forwarded by the contractors to the dépôt.

At the dépôt the men should be enlisted, attached to divisions, clothed, and equipped ; the animals fitted with their harness or saddlery; the superintendents and drivers practised in fitting saddles, loading and unloading; greasing harness, slinging and unslinging animals, and other useful work.

Whilst this work of organization proceeds, the proper authorities will engage the shipping necessary to convey the corps to the port of debarkation. The ships chartered for the conveyance of animals should be roomy, well ventilated, and, generally speaking, built for voyages in warm latitudes. They should not be less than 1,000 tons burthen, wooden ships being preferable to iron ones. Vessels with 30ft. beam allow of a row of stalls on each side with a passage of 10ft. or more in the centre and 3ft. between the side of the ship and the back of the stalls. Any ship whose breadth of beam is less than this is not well suited for animals. The hatchways should not be less than 10ft. \times 10ft., and the tonnage required is calculated at about 10 tons per animal. In fair weather animals can be conveyed in sailing ships towed by powerful steamers. In height between the planking of the

leaders and driven by small Hottentots using enormous bamboo whips eighteen to twenty feet in length; in the war in New Zealand, two-wheeled carts used, with one horse in the shafts and a second horse leading; in the American War, long wagons drawn by six horses or mules, and driven by one man mounted on the near wheeler. As countries differ greatly from each other, their nature and general state of the roads alone can determine the most appropriate kind of wheeled transport suitable for each. All carts, wagons, &c., particularly those for use in the East, where the animals as a rule are much smaller than at home, should be of a light description—strong, no doubt, but never of such cumbersome construction as to conduce to waste of strength in the cattle required to draw them. If made much after the pattern of those in use in the country itself, and horsed in the same way, they will be found generally to answer well.

The adoption of one pattern carriage alike for all services, which has been advocated by some writers abroad, is impossible, on account of the variety of uses carriages are put to. One of the arguments in favour of this measure is the supposed advantage of being able to utilize the empty carriages of every service for any purpose on a sudden contingency arising; but the transferring of transport carriages from one service to another would lead to serious results, as it would cause confusion, and would tend to disorganize, for a longer or shorter period, that portion of the Army which has been deprived of its carriage. At first sight, it appears that horses might with advantage be changed during the progress of a war, so that those which have for some time drawn heavy loads might be transferred to lighter ones, and thus suffer a lesser strain on their constitutions. In practice this has not been found to work well; and it is not advisable to shift them from one section to another. Empty carriages returning to the rear may and have been frequently used to remove sick and wounded. Some of these are without cover or protection from sun and rain; others are without springs, and therefore unsuitable for this purpose; but necessity knows no law, and necessity at times compels their use.

With carriages what is principally required is that they should be light, the dead weight being reduced to a minimum, and the horses should be led by drivers and not by riders. With regard to this last point, the system of having a rider for each pair of horses is nothing less than a waste of power in transport, where the horses are neither required to go at the pace Artillery are required to move at, nor to pass over every description of ground. The near horses have enough of work to do in carrying the rider, and are of little real assistance in drawing. This style of driving with postilions is never met with in the ordinary carriage of any country. Why should it be retained in the transport of any army, where more economy of power is needed?

"The general carriage of the country in which an army is campaigning should be used as much as possible, not only because it can be more easily replaced, but likewise that it is generally more suited to

6 head pads to use in slinging.

1 head stall per animal ; fifteen per cent. spare.

1 hay net per stall, five per cent spare.

1 scraper per stall.

50 per cent. of brooms, with a reserve.

1 small basket per man, with reserve.

1 water bucket for each five animals, 20 spare.

10 per cent. of lanterns, with padlocks and keys.

7 lbs. chloride of zinc per day.

4 lbs. MacDougall's disinfecting powder per day.

1 piece of rock salt for each manger.

30 head pads and horse hammocks or resting slings to every 100 animals.

2 tubs for soaking grain.

Some large baskets for hoisting litter up the hatches.

4 peck and half peck measures for each 100 horses.

10 per cent of shovels for filling baskets.

40 or 50 coir mats for sick animals, others to lay down in the passages when moving or shifting animals.

1 swab to every two or three men.

Saltpetre, vinegar, linseed, pepper-corns, etc : should be shipped according to distance and probable duration of the voyage, number of horses, etc :

A liberal supply of spare battens and a percentage of all fittings especially side and breast bales, which are likely to get broken in rough weather.

A veterinary surgeon, native farrier (Solutree), or cattle doctor, should be on board of each ship, with a store of medicines. The animals should be embarked in the same ship with their drivers and equipment complete. All drivers should be medically examined before embarkation ; and no animal should be embarked that shows any symptoms of suffering from a contagious disease. Drivers on the passage should be told off for duty to remove dung, sweep up litter, and watch the animals.

Each man should be provided with

1 Curry comb.

1 Brush.

1 Hand rubber (coir.)

1 Picker,

2 Towels.

weight laid down for this at 28cwt. 3qrs. 0lbs., or 3220lbs. Deduct from this the weight of the G. S. wagon (given in the "Soldiers' Pocket-book", at 19½cwts. or 1820lbs.) and we obtain 1404lbs. as the weight of the articles carried. Sir G. Wolseley, in his "Pocket-book," gives the load carried by the two-horse wagons used in the Red River Expedition, over very bad roads, as varying from 1600 to 1900lbs., which is a heavier load than what is carried by the G. S. wagon. This shows that by the use of suitable light carts and drivers, the number of transport carriages need not be increased, whilst the number of horses and men can undergo a considerable diminution. The Maltese cart drawn by mules has been found very well suited for service with an army in the field. Two-wheeled carts are, however, generally speaking, unsuited for very hilly roads.

The Abyssinian War afforded ample experience with regard to pack saddles and mule pads; in that expedition the Otago saddle* and the Punjab mule pad proved the best of all that were tried; the first weighs 43 lbs. and the second 34 lbs. Preference was given to the pad as being more easily repaired, better capable of being fitted to animals of various sizes, simpler, lighter, more economical, and packed with greater facility when not in use.

In the New Zealand War the Otago saddle was highly approved of by the Transport and Commissariat Officers. In China, a strong, light, and easily-repaired saddle from Manilla, made of bamboo, was found to answer well, and the Indian mule pad with saleeta bags was also much in favour.

The saleeta bags are large pieces of stout coarse canvas, furnished with eyelet holes all round, through which runs a rope; when the rope is tightened, it assumes the form of a bag, and is particularly useful to carry miscellaneous articles.

Captain T. J. Holland, Assistant Quarter Master General in Abyssinia, in his report on saddles, advocates one used in Mexico called the apparejo, which he describes as a large pair of leather saddle bags filled with straw; with these saddles in Mexico one muleteer attends on the march on eight mules.

He states: "The advantages of a pack saddle of the above description are that its cost is but little; large numbers can be packed in a comparatively small compass and sent to the port of debarkation; each mule can carry a spare pack saddle unstuffed. Repairs can with facility be effected. Its size distributes the weight of the load over the whole of the animal's back. It is not liable to turn. It serves as a covering at night for the mule, and, by care and attention in arranging the straw stuffing, ought never to cause galls or sore backs."

* It forms a good riding saddle.

Harness for the regular transport should be good English harness, Artillery pattern ; all of one pattern, and interchangeable. Transport horses will thus be able to be used for Artillery purposes, should a necessity for doing so arise.

To keep animals in good health and fit for work it is particularly necessary to have good drivers—men who possess a fair knowledge of the animals they have to attend on ; no more animals should be placed under the charge of one man than he can well look after.

Elephants require one mahout, or driver, and a boy ; one driver is necessary for each pair of ponies, mules, camels, and draught bullocks ; one man can look after five or more donkeys ; experienced drivers are required for pack bullocks, and one good man can look after a large number of them. Proper interpreters to convey orders to the drivers, and to make known their complaints to their officers, are indispensable.

The great advantage of having officers acquainted with the language and customs of the men would be attained in any expedition sent to Egypt, the Persian Gulf, the East Coast of Africa, and China, by employing only drivers from India, independent altogether as to whence the animals are obtained.

RATIONS FOR TRANSPORT ANIMALS.

Draught and Pack Horses.

10 lbs. oats.		8 lbs. oats.
12 lbs. hay.		10 lbs. hay.
<i>In India.</i>		
Arabs.		Colonial.
8 lbs. gram.		10 lbs. gram.
30 lbs. grass, or		30 lbs. grass, or
15 lbs. hay.		15 lbs. hay.

Mules and Ponies.

10 lbs. barley or 5 lbs. gram.
12 lbs. chopped straw or hay.

Bullocks.

6 lbs. barley or 4 lbs. gram.
12 lbs. chopped straw or hay.

Camels.

9 lbs. barley or 5 lbs. gram.*
12 lbs. chopped straw or hay, or leaves of trees when procurable.

* One lb. of flour mixed with ghee (clarified butter) is worth double the quantity of grain. In the march through the Bolan Pass in 1839 some of the camels, private property of the officers, were preserved by being fed with flour goor (sugar), and ghee ; a mode of feeding used for Swaree (riding) camels.

feel happier and feed better when standing close to those they are accustomed to be with.

Ventilation and cleanliness on board transports are the principal points demanding attention. No baggage of any description is to be allowed on the animal deck. Constant attention must be paid both by day and by night to the trimming of the wind sails and ventilators, as the well being of the animals depends so much on their getting as much fresh air as possible. Special intelligent men therefore should be told off to look after the ventilators and lanterns. Delicate animals must be put in the most airy part of the ship which is generally below the hatch.

The animals should be groomed daily, and every attention should be paid to the food and watering. The spare stalls are particularly provided for the convenience of cleaning the animals; they can thus be shifted, rubbed over, and have their feet washed. The mouths, nostrils, and occasionally the hocks, particularly of sickly animals, should be sponged with vinegar.

The drivers should in very rough weather stand at the animals heads, to reassure them. Coir mats will be found useful in rough weather, but should only be used then, and taken up and dried as soon as no longer required, otherwise they will stink and become full of insects. When no coir mats are furnished, fine cinders or sand should be sprinkled over the floor of each stall.

Food for the first few days should be given rather sparingly, and bran should form the larger portion of the diet; when the appetite of the animals increases they should be fed more liberally.

SCALE OF SEA FORAGE FOR ANIMALS ON BOARD TRANSPORT SHIPS.

Horses.

Oats	6	lbs., or 5lbs. gram.
Bran	1	lb.
Hay	10	to 14 lbs.
Pepper	$\frac{1}{2}$	oz.
Water	5	to 6 gallons.

Ponies, Mules, and Asses.

Gram	4	lbs.
Bran	10	oz.
Hay	10	lbs.
Pepper	6	drams.
Water	5	gallons.

Camels.

Gram	4	lbs.
Forage	30	lbs.
Water	8	gallons.

TRANSPORT OF ANIMALS

BY SEA TO PORT OF DEBARKATION.

Owing to the peculiarity of our insular position, all our wars and expeditions take place far away, some thousands of miles from England. In the East also our most important expedition are not generally those sent across the frontier, but the ones fitted out in India for service in some distant country. It follows from this that we have either to organize a Transport Corps on landing in an enemy's country, or in that of an ally we desire to protect and defend or else we have to organize one at home, in India or elsewhere, and forward it to the seat war.

Always, when possible, it will be the best plan to organize one previous to its being despatched to the seat of war; there the services of such a corps will be immediately required, and a previously organized one will, after landing, be available for almost immediate work.

To provide against loss of animals on the passage, and for all being landed in a fit state for work, certain arrangements are necessary, and the following appear to be the ones demanding particular attention :—

A commandant and staff sufficient for all requirements should be established at the port of embarkation, or wheresoever the transport dépôt is formed, where the animals and *materiel* would in the first instance be assembled, where the corps would be organized, and thence forwarded to its destination.

Contracts for animals and equipment may be entered into in any of the neighbouring markets, but every article for the transport should be forwarded by the contractors to the dépôt.

At the dépôt the men should be enlisted, attached to divisions, clothed, and equipped ; the animals fitted with their harness or saddlery; the superintendents and drivers practised in fitting saddles, loading and unloading; greasing harness, slinging and unslinging animals, and other useful work.

Whilst this work of organization proceeds, the proper authorities will engage the shipping necessary to convey the corps to the port of debarkation. The ships chartered for the conveyance of animals should be roomy, well ventilated, and, generally speaking, built for voyages in warm latitudes. They should not be less than 1,000 tons burthen, wooden ships being preferable to iron ones. Vessels with 30ft. beam allow of a row of stalls on each side with a passage of 10ft. or more in the centre and 3ft. between the side of the ship and the back of the stalls. Any ship whose breadth of beam is less than this is not well suited for animals. The hatchways should not be less than 10ft. \times 10ft., and the tonnage required is calculated at about 10 tons per animal. In fair weather animals can be conveyed in sailing ships towed by powerful steamers. In height between the planking of the

to get the animals saddled, harnessed, and hooked in and ready to move off, for it will always be desirable to clear the landing-place as soon as possible. Great order and regularity should be observed on landing to avoid the confusion which otherwise is sure to arise. The commanders of squads should see that the saddles, harness, and carriages of their squads are collected together, and the animals are moved up to them as soon as landed, and that the drivers lose no time in saddling and harnessing without noise. When the division is ready, the officer commanding it will march it off to the encamping ground, or other locality assigned for it by the debarkation officer.

6 head pads to use in slinging.

1 head stall per animal ; fifteen per cent. spare.

1 hay net per stall, five per cent spare.

1 scraper per stall.

50 per cent. of brooms, with a reserve.

1 small basket per man, with reserve.

1 water bucket for each five animals, 20 spare.

10 per cent. of lanterns, with padlocks and keys.

7 lbs. chloride of zinc per day.

4 lbs. MacDougall's disinfecting powder per day.

1 piece of rock salt for each manger.

30 head pads and horse hammocks or resting slings to every 100 animals.

2 tubs for soaking grain.

Some large baskets for hoisting litter up the hatches.

4 peck and half peck measures for each 100 horses.

10 per cent of shovels for filling baskets.

40 or 50 coir mats for sick animals, others to lay down in the passages when moving or shifting animals.

1 swab to every two or three men.

Saltpetre, vinegar, linseed, pepper-corns, etc : should be shipped according to distance and probable duration of the voyage, number of horses, etc :

A liberal supply of spare battens and a percentage of all fittings especially side and breast bales, which are likely to get broken in rough weather.

A veterinary surgeon, native farrier (Solutree), or cattle doctor, should be on board of each ship, with a store of medicines. The animals should be embarked in the same ship with their drivers and equipment complete. All drivers should be medically examined before embarkation ; and no animal should be embarked that shows any symptoms of suffering from a contagious disease. Drivers on the passage should be told off for duty to remove dung, sweep up litter, and watch the animals.

Each man should be provided with

1 Curry comb.

1 Brush.

1 Hand rubber (coir.)

1 Picker,

2 Towels.

Transport by contract is always preferable to that requisitioned and with regard to this last it must be noticed that in requisitioned transport there will be many bad carts, and many bad, useless animals, entirely unfit for long marches. The superintendence for this kind of transport requires to be military, and on a sufficiently large scale to provide against the desertion of the drivers and the loss of carriage. When we must have requisitions, it will be found the most judicious plan to pay the men, and pay them also well, so as to retain both the owners and the drivers through their love of gain.

The same individuals should not be retained too long, for the men will then remain more willingly, whilst also, by frequently renewing the animals, carts, harness, &c., these will be in a better condition for the work required. All promises with regard to pay and duration of service should be strictly fulfilled, otherwise the men will desert in large numbers, whatsoever may be the risks they incur by doing so.

The following extract from a small pamphlet by an officer of the Bavarian Etappen Inspektion, from notes collected during the war of 1870-71, with regard to auxiliary and requisitioned transport, will convey useful instruction on this important subject :—

"Before undertaking the formation of extensive magazines, one must feel sure to be able to collect large quantities of supplies, and to have the means of having them conveyed in every direction. For this object good transport parks must be organized in good time. This important question is deserving of a special study."

"Many States have a law of conscription for horses; Bavaria is in the number of those which do not possess such an institution. In the first of these the state levies the horses and furnishes wagons and drivers, generally taken from the Landwehr; ordinarily two hundred carriages are placed under the orders of a senior subaltern officer, assisted by some non-commissioned officers (who in Prussia are often young land-owners,) some mounted soldiers of the train, some farriers, and saddlers. This institution is excellent, as it enables them to have columns ready to march at the same time as the troops."

"A portion of these parks marches with the various corps; the other (generally the largest) remains under the orders of the General Etappen Inspektion. The wear and tear of these parks in men and in material is very considerable, because these are always on the march, even in most stormy weathers; they go seldom into quarters, and have generally hurriedly-prepared and indifferent food. It is not a pleasant service to be every day on the road, often until the middle of the night, exposed to all weathers, working constantly in attending on tired horses, and to remain whole months without lying under the shelter of a roof and without getting a substantial meal."

" The Etappen commands can do much to remedy these hard necessities. In the last war, from the end of September to the beginning of January, no steps were taken with regard to this subject.

" When the parks are insufficient, the Civil Commissioner and the General Etappen Inspektion demand the forwarding of new reinforcements, or form parks with carriage requisitioned in the enemy's country; in this last case the Civil Commissioner issues the necessary orders. He comes to an understanding with all the new civil functionaries of the district which is to furnish the requisitioned carriages; they cause requisitions to be served by the local authorities, if necessary getting assistance from the Etappen troops; the carriages are collected in a certain locality fixed by the Etappen Commandant; this last superintends the maintenance of the park, obtains receipts for the articles he furnishes it with, forwards it immediately with sufficient escort to the locality appointed for the park.

" Acting in a different way, one would risk not getting more than one-half of the carriages asked for; also the drivers would exchange on the way the good ones they have for the worst they would find. The local authorities find a thousand pretexts to repudiate all responsibility, and of what use are then all punishments and fines? It is not by means of money and notes that one will make despatches without carriages. Requisitions during the last war have shown plenty of room for improvement, but the fault lay more with the individuals than with the system.

" When one requisitions in an enemy's country hundreds and thousands of carriages, he should attend to give them a sufficient escort to feed the drivers, in winter to give them warm clothing and a small, salary. The escort and leading of these parks is entrusted to officers and *employés*.

* * * * *

.. " The Intendant and Staff Officer should know intimately the strength of their park and the services it is able to perform, so as to issue only reasonable orders for the conveyance of supplies in every direction."

Where transport can be obtained by contract, all the obligations of the Government and contractor are entered in the agreement. The contractor furnishes the animals, carriages, drivers, superintendents, &c.; as a rule, he attends to the feeding and the foraging, and to the payment of the drivers, the shoeing of the animals, repairs of all kinds, and replacements that become necessary from time to time during the duration of the contract.

Requisitions may be demanded from place to place, from day to day, or for a limited number of days. At the completion of the service the carriages and animals should be returned, the drivers furnished with a certificate showing where they came from, and on what work they have been employed; this will save them from being pressed again on their

return to their homes. In serving requisitions for transport, a larger number of carriages and animals than actually required should always be demanded, to be able to discard any that do not appear fit for the work to be undertaken.

The second line of transport, working between the base and the most advanced magazines, can be worked either by direct convoys or by relays. The staging system by relays has the advantage of rapidity ; if relays of animals are placed on the road at regular stages, a convoy can march by day and by night, and accomplish two or three ordinary marches in the twenty-four hours.

This system can be employed with advantage when magazines have to be established on any principal line of communication deficient in railways, or when it becomes necessary to quit a railway at a certain part of the line to carry on operations at some distance away from it.

The advantages of the staging system are many. The drivers and animals always working on the same part of the road, on one they are well acquainted with, work more cheerfully and are less fatigued. They are always well fed, well sheltered, and in good trim. The men being near their own places of abode can feed themselves and their animals, thus relieving the Commissariat of all care regarding their subsistence. A larger quantity of provisions can be conveyed in a given time to a certain place. The return journey allows of comparative rest to the animals every other day, and with spare animals a certain number each day need not quit the stables. In cases of requisitions this system does not press as heavily on the inhabitants as sending their carts and animals far away from their homes.

The conductor of the convoy should in all cases proceed in charge of it right through the several stages, and should be answerable for the correct delivery of the stores. With requisitioned carriage the stores will have to be unloaded and reloaded at each station, which will cause a loss of time.

In removing a large number of wounded after a battle,* or when a flank movement of the army necessitates a change in the line of communication, or a retreat the hasty removal of magazines, then the system of direct convoys becomes preferable to that of relays.

In every case the officers in charge of posts on the line of communication must obtain full knowledge of the resources of the country

* The Auxiliary Transport can render great services in return journeys, by removing the sick and wounded from the hospitals in front, which will permit of these being in a state to receive fresh admissions. After a hard-fought battle, or in cases of epidemic, the admissions into hospital will be very numerous, and will require the continual removal of the first sufferers to the rear, to be distributed among the hospitals at the base or on those established along the line of communication. The Transport attached to the Medical Department will not be sufficient, and perhaps unavailable, for this duty, and the Auxiliary Transport must render all possible assistance.

around in all available means of transport, to be able at the shortest notice to gather them in and place them at the service of the army. An increase of transport may be necessary even in a country traversed by railways, consequent on a stoppage of traffic on the line through accident or the operations of the enemy, or by the line being reserved entirely for reinforcements of men, horses, or artillery. It will also be necessary to become acquainted with the roads parallel to the principal line of communication, and above all to ascertain which are the ones that have not been denuded of provisions and forage.

The obtaining of transport by contract or forced requisitions can be put into practice in European countries, or in our own territories in India ; but in most of our wars elsewhere we have had to fall back on purchasing as the only means of raising a sufficient transport for our armies.

Our transport has generally been insufficient for our wants ; hence we have had to resort to all kinds of makeshifts. In Continental armies, the military, or first line of transport, is always ready and prepared to cross the frontier with the troops ; in most of our wars we have found ourselves at their commencement without even the vestige of one. Our preparations generally speaking, lack the sufficient time required ; officers are sent to all the likely markets to purchase animals, but often the total amount required has not been obtained before the war comes abruptly to an end. As examples of this we have the Persian and the last China Wars, in both of which the war was over before the full complement of transport animals had been obtained, entailing a large expenditure to Government without the slightest return.

What length of time will be required to complete the necessary purchases of animals for the formation of a Transport Corps the property of Government for service in Europe ? The late Colonel Clarke-Kennedy in 1867 purchased for the Abyssinian Expedition in the countries north of the Isthmus of Suez 8,000 mules in between two and three months. With the same conditions and with the same markets open to us, we could purchase the number of animals sufficient for one Army Corps in about the same time, or even less, for it should be remembered that Colonel Clarke-Kennedy's purchases were confined to mules ; had they been extended to horses, the amount of animals required would have been obtained in a shorter time. We might besides, also, purchase horses at home, and be able to enter into contracts for transport at the port of debarkation, which would materially reduce the time necessary for completing our Transport Corps. However, with the state of readiness for war in which the armies on the continent are at the present moment, to require two months, at least, to complete one's preparations, is to give one's opponent an enormous advantage.

Our wars differ materially from the wars of the Continent, and it will be a useful study to examine the course generally pursued in one of our usual expeditions in wild and uncivilized countries. We must

to get the animals saddled, harnessed, and hooked in and ready to move off, for it will always be desirable to clear the landing-place as soon as possible. Great order and regularity should be observed on landing to avoid the confusion which otherwise is sure to arise. The commanders of squads should see that the saddles, harness, and carriages of their squads are collected together, and the animals are moved up to them as soon as landed, and that the drivers lose no time in saddling and harnessing without noise. When the division is ready, the officer commanding it will march it off to the encamping ground, or other locality assigned for it by the debarkation officer.

before it is thoroughly organized is to prepare for a failure which is sure to come sooner or later.

During a war or expedition it is difficult to organize, especially the transport, whose work commences the moment the troops disembark. If the Duke of Wellington did organize by degrees, as the Peninsular War went on, still that war lasted several years with long periods of inactivity. Our Land Transport Corps also in the Crimea acquired its organization whilst the troops were stationary before Sebastopol. We generally wait until an army actually takes the field, then organize the transport slowly and with difficulty.

In these expeditions the movements of the troops depend entirely on the efficiency of the transport arrangements, and the rapidity of their forward movements will keep pace with the establishment of magazines on the line of advance.

In many cases, such as in New Zealand, Abyssinia, and the Gold Coast, troops have had to make roads,* or at all events to improve the existing ones, before a regular advance into the interior could be made. This, of course, delays considerably the operations, but it tends to strengthen the line of communication with the base, and will facilitate the forwarding of supplies during the progress of the expedition.

Generally speaking, the troops advance and retire, after the completion of their mission, by the same route; therefore provisions are required for the advance, the return, and for any stay that may become necessary either by the course the operations have taken, or that may have been actually foreseen. As regards the stations in the rear, there is generally no real difficulty as far as supplying the troops in the return journey; the main point is to clear the stations of all surplus stores as the army falls back. As the transport available increases as the troops approach the base, there is little difficulty in doing this; but such is not the case with reference to the stations in the front, where a large surplus flow of stores must come up to allow of the formation of magazines, at the same time that the army subsists on the stores that are brought up.

If what is brought up is consumed entirely by the troops, and required to feed the detachments écheloned on the line of communication as well, the formation of magazines or reserves becomes impossible. Here the officers commanding posts on the line of communication could play an important rôle by obtaining what local supplies are procurable for the use of their detachments, without touching what comes from the rear for the advancing army; but in these countries the supplies to be procured locally are very few indeed, and, without a large overflow of

* In the Bengal Army there are two regiments of Pioneers (the 23rd and 32nd). These are capital regiments for constructing and repairing roads, and would be very useful if employed on the line of communication.

all necessities from the base, to form magazines on the line of advance is almost impossible.

The troops as they advance leave detachments of various strength to protect posts, patrol the line of communication, escort convoys, and perform other important duties.*

If the country is unhealthy, or if an obstinate resistance is met with, there will be a flow of men in the direction of the base to take into consideration. In staging operations the return carts will be available to clear the hospitals ; the sick and wounded will only be men returning to the base earlier than the remainder of the army, and need not on that account call for extra arrangements to be made in the way of supplies ; but on point of escorts the matter is different, for the philanthropic tendencies of the day have not reached these wild regions. Where a simple badge or a modest flag saves the sick and wounded soldier in Europe, and calls for assistance from friends and foes alike the helpless soldier is looked on by the wild people we have to encounter as their prey, and the fate of an unguarded convoy of sick and wounded would be nothing short of massacre. Convoys of sick take a great deal of space, and demand a large number of men as escorts for their effective protection.

After a long and severe march, with periods of forced inactivity to enable the supplies to accumulate, the desired object of the expedition is attained either by the defeat of the enemy or by his coming to terms. In the first case he may remove into the interior, where he cannot be followed, as the operations would extend beyond any reasonable limit. In this case the retreat of our troops may be molested, particularly so if the enemy has not been discouraged by serious reverses. The magazines are removed as the army retires, and, if possible, the country is devastated, the enemy's villages and stores are burnt, and the cattle captured as punishment for their bad behaviour, and as the only means of preventing the recurrence of the same through fear of the loss it will entail on them in the way of retribution. This will also prevent the enemy following up and annoying the troops in retreat. In the second case the return of the army may be even facilitated by the assistance obtained from the former opponent.

The army either re-embarks or returns to the frontier station ; the transport has completed the mission for which it was raised, there is no further use for it ; and it is broken up ; the animals and stores are disposed of generally at a loss. It will seldom be of advantage to Government to sell the animals at the base itself; it would be in most cases more economical to disperse the transport amongst a certain number of stations before selling them, so as to be able to realize a fair price at the sale, which will never be obtained if the animals are sold

* The number of men in front to feed will therefore decrease more and more as the troops near the objective.

at the base. With the transport goes all the experience gained by the officers and men : the traditions are not handed down from one to another : a fresh war breaks out, and a fresh transport is formed, and the experience dearly bought in one expedition is thus rendered unavailable for future use.

(To be continued.)

return to their homes. In serving requisitions for transport, a larger number of carriages and animals than actually required should always be demanded, to be able to discard any that do not appear fit for the work to be undertaken.

The second line of transport, working between the base and the most advanced magazines, can be worked either by direct convoys or by relays. The staging system by relays has the advantage of rapidity ; if relays of animals are placed on the road at regular stages, a convoy can march by day and by night, and accomplish two or three ordinary marches in the twenty-four hours.

This system can be employed with advantage when magazines have to be established on any principal line of communication deficient in railways, or when it becomes necessary to quit a railway at a certain part of the line to carry on operations at some distance away from it.

The advantages of the staging system are many. The drivers and animals always working on the same part of the road, on one they are well acquainted with, work more cheerfully and are less fatigued. They are always well fed, well sheltered, and in good trim. The men being near their own places of abode can feed themselves and their animals, thus relieving the Commissariat of all care regarding their subsistence. A larger quantity of provisions can be conveyed in a given time to a certain place. The return journey allows of comparative rest to the animals every other day, and with spare animals a certain number each day need not quit the stables. In cases of requisitions this system does not press as heavily on the inhabitants as sending their carts and animals far away from their homes.

The conductor of the convoy should in all cases proceed in charge of it right through the several stages, and should be answerable for the correct delivery of the stores. With requisitioned carriage the stores will have to be unloaded and reloaded at each station, which will cause a loss of time.

In removing a large number of wounded after a battle,* or when a flank movement of the army necessitates a change in the line of communication, or a retreat the hasty removal of magazines, then the system of direct convoys becomes preferable to that of relays.

In every case the officers in charge of posts on the line of communication must obtain full knowledge of the resources of the country

* The Auxiliary Transport can render great services in return journeys, by removing the sick and wounded from the hospitals in front, which will permit of these being in a state to receive fresh admissions. After a hard-fought battle, or in cases of epidemic, the admissions into hospital will be very numerous, and will require the continual removal of the first sufferers to the rear, to be distributed among the hospitals at the base or on those established along the line of communication. The Transport attached to the Medical Department will not be sufficient, and perhaps unavailable, for this duty, and the Auxiliary Transport must render all possible assistance.

around in all available means of transport, to be able at the shortest notice to gather them in and place them at the service of the army. An increase of transport may be necessary even in a country traversed by railways, consequent on a stoppage of traffic on the line through accident or the operations of the enemy, or by the line being reserved entirely for reinforcements of men, horses, or artillery. It will also be necessary to become acquainted with the roads parallel to the principal line of communication, and above all to ascertain which are the ones that have not been denuded of provisions and forage.

The obtaining of transport by contract or forced requisitions can be put into practice in European countries, or in our own territories in India ; but in most of our wars elsewhere we have had to fall back on purchasing as the only means of raising a sufficient transport for our armies.

Our transport has generally been insufficient for our wants ; hence we have had to resort to all kinds of makeshifts. In Continental armies, the military, or first line of transport, is always ready and prepared to cross the frontier with the troops ; in most of our wars we have found ourselves at their commencement without even the vestige of one. Our preparations generally speaking, lack the sufficient time required ; officers are sent to all the likely markets to purchase animals, but often the total amount required has not been obtained before the war comes abruptly to an end. As examples of this we have the Persian and the last China Wars, in both of which the war was over before the full complement of transport animals had been obtained, entailing a large expenditure to Government without the slightest return.

What length of time will be required to complete the necessary purchases of animals for the formation of a Transport Corps the property of Government for service in Europe ? The late Colonel Clarke-Kennedy in 1867 purchased for the Abyssinian Expedition in the countries north of the Isthmus of Suez 8,000 mules in between two and three months. With the same conditions and with the same markets open to us, we could purchase the number of animals sufficient for one Army Corps in about the same time, or even less, for it should be remembered that Colonel Clarke-Kennedy's purchases were confined to mules ; had they been extended to horses, the amount of animals required would have been obtained in a shorter time. We might besides, also, purchase horses at home, and be able to enter into contracts for transport at the port of debarkation, which would materially reduce the time necessary for completing our Transport Corps. However, with the state of readiness for war in which the armies on the continent are at the present moment, to require two months, at least, to complete one's preparations, is to give one's opponent an enormous advantage.

Our wars differ materially from the wars of the Continent, and it will be a useful study to examine the course generally pursued in one of our usual expeditions in wild and uncivilized countries. We must

4. It should be sufficiently strong to be of use for some years, and to resist storms.
5. It can be set up where neither wood, brushwood or reeds are at hand.
6. It should be perfectly dry.
7. It should weigh as little as possible without hampering in any way the requirements under 2, 3 and 4.
8. It should cost as little as possible.

DESCRIPTION OF THE BARRACK.

The principal materials are iron and felt, the framework is of iron as it weighs less than wood and secures at the same time strength and rigidity. It is lined inside and out with felt, a space one foot being left between the coverings. That felt is warm, waterproof, and light to carry is sufficiently proved by the constant experience of the wandering tribes who make their kibitkas of it. The barrack is quadrangular and measures 23 feet long outside.

Framework. The skeleton of the barrack consists of 12 frames of iron placed vertically at 7 feet apart so that each side is formed by 4 frames, 2 at the angles and 2 in the intermediate spaces. Each frame is composed of 2 vertical bars joined at the ends by 2 cross rods and by 2 in the middle. The height of the frames is $8\frac{1}{2}$ feet at the centre while the breadth of those at the angles is 1' 5" and of those at the intervals 1'. The frames are placed in grooves cut in the planks which serve as a foundation to the barrack and prevent the feet of the frames from sinking into the ground. When the ground is hard, the planks can be done away with and the frames placed directly on the soil, the planks also can be replaced by freestones fixed under the frames. The heads of the frames are joined together by a rod of iron with male screws in the centre and hooks at the ends.

The frame of the roof is formed with two diagonal trusses and 8 side rafters, each principal consists of a frame of iron similar to those forming the walls—the two longitudinal bars of each of the four principals of the diagonal trusses are joined together by five small rods, and those of the side rafters by four rods—the feet of the principals are fixed to the heads of the vertical wall frames—each by two male screws while the upper ends are attached to a collar which encircles the funnel of the ventilator, the upper ends of the side rafters are screwed to the diagonal trusses, six tie-beams of iron with screws in the middle serve to neutralise the thrust of the principals, (two of these for the two diagonal trusses and four for the eight side rafters.) To give the frame work power to resist the wind, the twelve feet of the principals are attached by twelve rods of iron to oak pegs driven into the earth at eight feet

before it is thoroughly organized is to prepare for a failure which is sure to come sooner or later.

During a war or expedition it is difficult to organize, especially the transport, whose work commences the moment the troops disembark. If the Duke of Wellington did organize by degrees, as the Peninsular War went on, still that war lasted several years with long periods of inactivity. Our Land Transport Corps also in the Crimea acquired its organization whilst the troops were stationary before Sebastopol. We generally wait until an army actually takes the field, then organize the transport slowly and with difficulty.

In these expeditions the movements of the troops depend entirely on the efficiency of the transport arrangements, and the rapidity of their forward movements will keep pace with the establishment of magazines on the line of advance.

In many cases, such as in New Zealand, Abyssinia, and the Gold Coast, troops have had to make roads,* or at all events to improve the existing ones, before a regular advance into the interior could be made. This, of course, delays considerably the operations, but it tends to strengthen the line of communication with the base, and will facilitate the forwarding of supplies during the progress of the expedition.

Generally speaking, the troops advance and retire, after the completion of their mission, by the same route; therefore provisions are required for the advance, the return, and for any stay that may become necessary either by the course the operations have taken, or that may have been actually foreseen. As regards the stations in the rear, there is generally no real difficulty as far as supplying the troops in the return journey; the main point is to clear the stations of all surplus stores as the army falls back. As the transport available increases as the troops approach the base, there is little difficulty in doing this; but such is not the case with reference to the stations in the front, where a large surplus flow of stores must come up to allow of the formation of magazines, at the same time that the army subsists on the stores that are brought up.

If what is brought up is consumed entirely by the troops, and required to feed the detachments écheloned on the line of communication as well, the formation of magazines or reserves becomes impossible. Here the officers commanding posts on the line of communication could play an important rôle by obtaining what local supplies are procurable for the use of their detachments, without touching what comes from the rear for the advancing army; but in these countries the supplies to be procured locally are very few indeed, and, without a large overflow of

* In the Bengal Army there are two regiments of Pioneers (the 23rd and 32nd). These are capital regiments for constructing and repairing roads, and would be very useful if employed on the line of communication.

all necessaries from the base, to form magazines on the line of advance is almost impossible.

The troops as they advance leave detachments of various strength to protect posts, patrol the line of communication, escort convoys, and perform other important duties.*

If the country is unhealthy, or if an obstinate resistance is met with, there will be a flow of men in the direction of the base to take into consideration. In staging operations the return carts will be available to clear the hospitals ; the sick and wounded will only be men returning to the base earlier than the remainder of the army, and need not on that account call for extra arrangements to be made in the way of supplies ; but on point of escorts the matter is different, for the philanthropic tendencies of the day have not reached these wild regions. Where a simple badge or a modest flag saves the sick and wounded soldier in Europe, and calls for assistance from friends and foes alike the helpless soldier is looked on by the wild people we have to encounter as their prey, and the fate of an unguarded convoy of sick and wounded would be nothing short of massacre. Convoys of sick take a great deal of space, and demand a large number of men as escorts for their effective protection.

After a long and severe march, with periods of forced inactivity to enable the supplies to accumulate, the desired object of the expedition is attained either by the defeat of the enemy or by his coming to terms. In the first case he may remove into the interior, where he cannot be followed, as the operations would extend beyond any reasonable limit. In this case the retreat of our troops may be molested, particularly so if the enemy has not been discouraged by serious reverses. The magazines are removed as the army retires, and, if possible, the country is devastated, the enemy's villages and stores are burnt, and the cattle captured as punishment for their bad behaviour, and as the only means of preventing the recurrence of the same through fear of the loss it will entail on them in the way of retribution. This will also prevent the enemy following up and annoying the troops in retreat. In the second case the return of the army may be even facilitated by the assistance obtained from the former opponent.

The army either re-embarks or returns to the frontier station ; the transport has completed the mission for which it was raised, there is no further use for it ; and it is broken up ; the animals and stores are disposed of generally at a loss. It will seldom be of advantage to Government to sell the animals at the base itself ; it would be in most cases more economical to disperse the transport amongst a certain number of stations before selling them, so as to be able to realize a fair price at the sale, which will never be obtained if the animals are sold

* The number of men in front to feed will therefore decrease more and more as the troops near the objective.

at the base. With the transport goes all the experience gained by the officers and men : the traditions are not handed down from one to another : a fresh war breaks out, and a fresh transport is formed, and the experience dearly bought in one expedition is thus rendered unavailable for future use.

(To be continued.)

VI.

PORTABLE BARRACK AMBULANCE FOR 9 BEDS.

(*Taken from a pamphlet written by General Pierre Rörberg of the Engineers, Tiflis Division of the Caucasus, St. Petersburg, 15th November 1875.*)

BY MAJOR A. LEMESSURIER, R.E.

The frame of the barrack is iron, with a double casing of felt and a space of one foot between the casings. According to local resources the felt can be replaced by planks, bundles of reeds, straw or hay.

The length and breadth of the barrack outside is 23 Russian feet (the Russian foot being equal to an English foot) and the height at the centre is 20 feet.

The barrack can hold 9 sick men lying down in beds suspended which should at the same time serve as litters for the transport of the wounded.

The interior space of the barrack affords 506 cubic feet of air to each patient.

It is warmed by means of an iron stove, the ventilation is secured by means of a funnel fixed to the summit of the roof so that the pure air circulates whilst the stove warms it.

The Barrack* costs 1,559 roubles (Tiflis currency) or nearly 5,197 francs (counting the rouble at 3½ francs) which makes 173 roubles or 577 francs per patient. The barrack weighs 150 pouds or 2,604 kilogrammes and can be carried in 2 military wagons drawn by 4 horses.

Barrack ambulance to take to pieces.—It is in time of war that difficulty is generally experienced in satisfactorily accommodating the sick and wounded. It will be lucky if in the vicinity of the troops, there may be a town with buildings, however, little adapted to the medical service, to give a chance of shelter, but when troops are called upon to act in a country not inhabited, or when the dwellings of the neighbourhood are unfit for invalids, as for example, the subterranean chambers without stoves, windows, and floors, in most of the Armenian, Tartar and Greek villages beyond the Caucasus, as well as in Turkish Armenia, hovels which resemble stables more than human dwellings, it is imperative to consider beforehand the means of lodging, comfortably, the wounded and sick. Although our soldier tents and military hospitals do not present even in summer all the comfort necessary for invalids (a certain number of whom it would often be dangerous to expose to draught, to damp during the rains, and to cold at night,) yet it can be considered at that season as a satisfactory shelter for most of the sick and wounded, provided the locality is not at an elevation where it is not rare to see snow fall even in the month of July. Nevertheless, the tent becomes quite unsuitable for a really cold season

* Comparatively the price would be Rs. 2,416. Weight is 5,728 lbs.

and in that case it is necessary to find shelter of another class for the sick.

The kibitka made of felt (the conical tent of the nomads) with a stove, can protect the sick from the inclemency of autumn and even of winter, if the cold is not intense but not during severe frosts. Besides the kibitka like the tent is liable to be torn in pieces and carried off by a storm.

The hut a small house built roughly of mud, of wood, of straw &c.) has the advantage of protecting the sick from the severity of the weather, of maintaining more easily an even temperature, of being more rigid to resist storms, but it possesses inconveniences of another kind, *viz.*, its construction demands more labor and time, it is not always watertight, the circulation of air is more difficult on account of fewer openings and there are circumstances where hut building becomes impossible, for example when the soil is rocky and when the locality offers neither poles or branches for the construction of the roof and supports for the ridge piece.

But where the sick and wounded have to be placed far from every dwelling, if the advanced season foretold inclemency and cold, when tents and kibtkas become impossible and when finally the nature of the earth presented insurmountable difficulties to the construction of huts or other temporary structures, would it not be useful in such the case, to have buildings which take to pieces all ready at the depots, which could be transported complete and set up without delay at the spots selected for temporary hospitals, or if admissible to leave behind such parts as can be replaced by materials available in the locality and to carry only those parts which cannot be dispensed with and so limit the demand for carriage which is always precious in time of war.

It is nearly impossible to adhere for this class of building, to one single type which shall fulfil all conditions. Special circumstances demand special construction and as the circumstances themselves vary, the types of barracks necessarily will be different—a barrack adapted to meet satisfactorily one condition will not suit another and consequently its general utility is impaired.

In preparing the plan of the barrack herein described, the following principles have been borne in mind :—

1. Each separate lodging ought to be arranged for a fixed number of sick, from 6 to 10 beds so as to prevent an epidemic in case of contagious disease.
2. The barrack should keep warm at a temperature of 10° Reamur (54° Fahr.).
3. It should admit fresh air freely.

the trusses, but to avoid a smilar inconvenienoe a lattice of iron wire should be added. A roof formed of a single bed of sheaves let the water through after the plaster of clay had been washed away by the rain—this shows the necessity of a second layer of bundles added in such a way that the upper tier is placed in the joints of those in the layer below. The roofing felt which was attached only to the trusses at the edge, beat against the side rafters when the wind blew and became torn. This circumstance shews equally the necessity of a supplementary lattice to which as well as to the trusses, the felt ought to be strongly attached by bands of leather, and furnished with buttons. The roof lantern supplied with 8 treillages has been found too complicated and too heavy and it is not adopted.

distance from the walls, these rods are furnished with female screws in the middle.

Felt covering.—The outer wall of the barrack consists of 4 panels of felt for the roof and four for the walls.

The panels of felt edged with bands of leather are joined to one another with buttons on one side and button holes on the other. Below the felt pieces of the roof other bands of leather of the necessary length are sewn, furnished with double straps, to attach them to the trusses and the walls; at the top of the roof the felt pieces are attached to a ring of iron screwed on to the ventilating funnel.

The felt pieces forming the covering of the walls are also furnished with bands of leather as long as the frames and also an iron band stretched vertically between the frames to which they are attached by means of straps sewn to bands.

Round the doors and the windows, the felt pieces are fastened and screwed by rods of iron to the frame and in the same way to the foundation planks.

The interior covering of the barrack is composed also of 4 panels of felt forming the ceiling and of 4 others forming the walls. These are also furnished with bands of leather at the edges the length of the panels and trusses, and are attached to the framework in the same manner as the exterior wall. All the interior lining is painted with white oil color so that it can be washed and sprinkled with disinfecting fluids.

INTERIOR ARRANGEMENT.

The interior of the barrack is divided into 3 parts, the porch $4\frac{1}{2}$ feet long by 3' wide, the latrine 7' \times 3', and the part reserved for the sick.

The porch and the latrine are covered with a thick ceiling cloth. The object of the porch is to protect the invalids from the wind and cold when the outer door is opened, as well as to separate the privy from the room in which the sick are and also to prevent the tainted air from penetrating into that part of the barrack.

Flooring.—The flooring ought not to be considered as part of the barrack material, for it increases the weight so much—it should be made from material on the spot—a floor of asphalt or in cement answers better the conditions of cleanliness and disinfection, clay offers equally a good floor on account of its impermeability. For want of these materials and when wood has to be prepared, planks are provided—but when all these materials are wanting the floor can be paved with slabs or bricks and only in an extreme case does one put up with a flooring of earth.

Doors.—The outer door of the barrack is double and folding. The outside folds are panelled and the inner hung with felt. The width of the door ($4\frac{1}{2}$ feet) is such that in opening the 2 folds there is sufficient space for the entry of a litter with a wounded man. In ordinary use the left hand fold of the door would only be opened. The upper panels of the door outside are glazed.

The door leading from the porch to the sick room is also of 2 folds, formed of felt stretched over a wood frame. The latrine door is similarly made of felt stretched over a light frame.

Windows.—The barrack is provided with 2 windows $4\frac{3}{4}$ ' long $\times 1\frac{1}{2}'$ high in the upper part of the 2 side walls. Narrow and placed high up, they protect the invalid better from the currents of air which enter the room when they are open. The wood frames of the windows are suspended by 2 hooks to the iron bars forming the heads of the frames. The windows are double. The outer windows open outwards while the inner, divided horizontally in 2 parts and fitted at the ends with 2 zinc pinions turn inwards. When the upper part of the inner windows only is opened, the fresh air flows towards the ceiling without any inconvenience to the patients.

The latrine has a small window of 1 foot square hanging to the frame work, in the same way as the other 2 windows of the barrack.

Fuel.—An iron stove 5' high 1' 8" wide and 2' 9" long serves to heat the barrack. The hearth of the stove with its ashpan is placed on a flagstone forming the foundation. The flagstone is furnished with 8 iron feet, which raise it 9" above the floor. The smoke escapes by 2 funnels with joints placed one beside the other and which before leaving the stove join to form the chimney.

In order to avoid the contact of the air with the hearth and the funnels reddened by the heat, the whole stove and ashpan is covered with an iron plated jacket placed upon the flagstone and attached to the hearth as well as to the 2 funnels by means of hooks. The space between the jacket and the hearth with the funnels is filled with sand to prevent the too rapid cooling of the stove. The outside air enters the stove by a jointed pipe, heats itself and escapes into the barrack by several openings. To regulate and to stop the entry of the fresh air into the stove the pipe is provided with a damper. Upon the hearth a portable kettle is placed for warming water, it is supplied with two handles to lift it off the hearth, with a funnel by which it is filled, with a spout by which to empty it, and a funnel for the issue of the steam. The chimney when it leaves the stove is furnished with a revolving damper, it follows at first the inclination of the roof then penetrating into the ventilating funnel at the middle of the ceiling it rises vertically. Below the inclined part of the chimney is attached an iron pipe, the space between this pipe and the chimney is filled with clay without which the resinous liquid thrown down by the

cooling of the smoke will not fail to leak at the joints of the chimney while the stove is heated.

VENTILATION.

The issue of impure air is secured by means of a ventilating funnel and is produced by the heat which pervades the chimney, passing as is mentioned above, through the centre of the ventilating funnel. This ventilating funnel is crowned with a conical iron roof resting on four feet. To regulate the ventilation and to stop the escape of hot air during extreme cold a cover is fitted to the lower opening of the funnel, opening and shutting by means of two cords on pulleys. It would be useful to keep in the ventilating funnel several openings in the depth of the trusses so as to be able to renew the air between the two felt coverings.

The chimney is attached to the ventilating funnel in three places by the aid of iron rings having each three tie-pieces which pass through the funnel and are screwed to it by female screws. To get rid of the air from the latrines a hose cloth is used which terminates at the ventilating funnel, the current of air in this hose is promoted by suspending in the latrines below the mouth of the hose a lamp to heat the air. A similar hose with its mouth above the lamp which lights the barrack abuts also underneath the ventilating funnel. The heat of the lamps produces ventilation when the stove ceases to burn. Independently of this artificial ventilation fresh air can be admitted to the interior of the barrack by lifting the foot of the covering of the walls.

HAMMOCKS FOR THE SICK.

The barrack contains nine slung hammocks. The hammock consists of a frame made with four rounded poles of maple or other hard wood $6\frac{1}{2}$ feet long by $2\frac{1}{2}$ feet broad—the two side pieces are $2\frac{1}{2}$ inches in diameter and the two cross pieces 2 inches. The frame is stretched with thick cloth and double felt forming the mattress, some cord with rings at the middle are attached to the two ends of the frame. Five hammocks are placed along one of the walls, a space of half a foot being left between those at the end and the wall—two others are placed against the iron frames of the building and the fifth against the middle of the window.

On the opposite side their position is the same except that there are only four hammocks, one of the angles of the barrack being occupied by the latrine. The four hammocks placed against the vertical frames are suspended at one end from hooks attached to the frames, at the other end by a wire attached for that purpose to the trusses. The hammocks which are placed against the windows are suspended by iron wire attached at one end above the opening of the windows and at the other end to the lattice. The iron wire to which are suspended the remaining hammocks is attached at one end to the iron rods

the trusses, but to avoid a smilar inconvenienoe a lattice of iron wire should be added. A roof formed of a single bed of sheaves let the water through after the plaster of clay had been washed away by the rain—this shows the necessity of a second layer of bundles added in such a way that the upper tier is placed in the joints of those in the layer below. The roofing felt which was attached only to the trusses at the edge, beat against the side rafters when the wind blew and became torn. This circumstance shews equally the necessity of a supplementary lattice to which as well as to the trusses, the felt ought to be strongly attached by bands of leather, and furnished with buttons. The roof lantern supplied with 8 treillages has been found too complicated and too heavy and it is not adopted.

The sheaves should be 6 inches to 9 inches in diameter and before being laid they should be dipped in moist clay. The roof is covered with 2 layers of sheaves attached to the principals and lattice by pack thread and then plastered with clay so as to protect the roof from sparks from the chimney. For the ceiling there should be a wire lattice to carry a bed of sheaves clay plastered above and with a painted cloth below. The exterior wall covering is made of a row of sheaves attached vertically to the lattice with pack thread and covered with plastering and white washed. The inside can be done in the same way.

Covering the framework with planks.—Where planks are obtainable they can be used instead of felt. Their thickness is a little more than 1 inch and their breadth 7 inches. They are so placed that an upper plank covers the one below it by an inch and is fastened by laths attached to the framework by bolts and screws. The chinks between the planks ought to be stopped, puttied or pitched. To preserve warmth in the barrack and abate cold in winter, it is useful to apply a coat of clay above the planks forming the ceiling and to fill with straw the empty space between the two coverings.

If bundles of reeds straw or hay or planks can be used instead of felt, the material of the barrack for transport will be greatly reduced, the weight of the parts remaining does not exceed 135 pouds (4,875 lbs.) The price of a barrack with coverings of reeds, straw or hay is not more than 950 roubles (Rs. 1472).

Precautions against infection.—Independently of washing and sprinkling the interior of the barrack with disinfecting fluid it is necessary to renew once a year the oil paint of the inside felt, wood and iron work. The wall covering and ceiling of reeds, straw or hay, can easily be renewed once a year. The felt ought to be changed every 2 or 3 years according to the class of sick using the barrack.

Experience already gained.—A similar barrack with but slight alterations had been set up at Tiflis* where it still stands after a year, perfectly solid and stable. During a very high wind there was not the least movement in the different parts, while with an atmosphere outside as low as 8° Cente. (18° Fahr) accompanied with a cold wind the mean temperature of the barrack was maintained at 18° Cente. (64° Fahr) During this time 40 lbs of half dry wood were burnt in the stove per day, which proves that it is possible to maintain the necessary warmth in the barrack when the cold is not too rigorous. The felt of the roof leaked only once, when the weight of the snow had formed hollows in the felt and then began to melt. The hollows had been formed because the felt had been stretched directly over

* The barrack set up at Tiflis carried besides the 2 windows at the sides, a lantern fixed at the top of the roof and crossed by the ventilating funnel. Instead of the iron stove, there was one of bricks, and the felt of the walls and roof was replaced by bundles of reeds smeared with clay.

the trusses, but to avoid a smilar inconvenienoe a lattice of iron wire should be added. A roof formed of a single bed of sheaves let the water through after the plaster of clay had been washed away by the rain—this shows the necessity of a second layer of bundles added in such a way that the upper tier is placed in the joints of those in the layer below. The roofing felt which was attached only to the trusses at the edge, beat against the side rafters when the wind blew and became torn. This circumstance shews equally the necessity of a supplementary lattice to which as well as to the trusses, the felt ought to be strongly attached by bands of leather, and furnished with buttons. The roof lantern supplied with 8 treillages has been found too complicated and too heavy and it is not adopted.

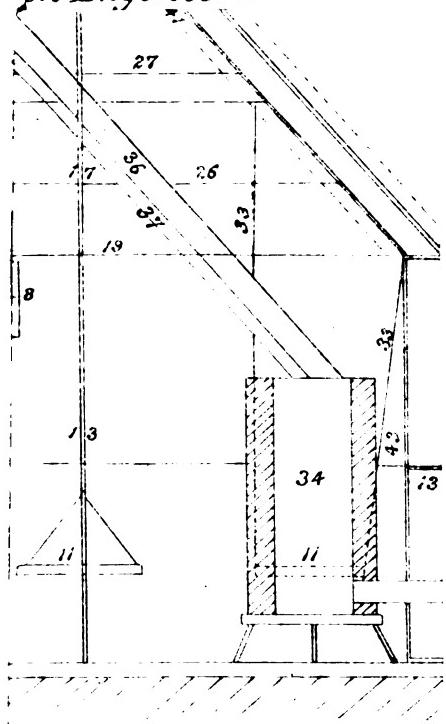
*Table of dimensions, weight, and price of different parts composing the Portable barrack ambulance
for 9 beds.*

NAMES OF PARTS.	Number.	Feet.			Ruppees.			Remarks.
		Length.	Breadth.	Depth.	Weight in lbs Avoird.	Rate for each.	Total.	
In Wood.								
1 Planks for foundation...	8	11	1.25	0.17	675.28	3.41	27.28	The calculation of prices corresponds with the rate of currency at Thiss.
2 Pegs with iron shoes below and rings above.	12	5	...	0.39	361.11	3.875	46.50	
3 Door outside, double with 2 folds	2	7	4.5	...	180.56	15.5	31.00	
4 Frame of ditto	1	7	4.5	...	144.45	6.2	6.2	
5 Door inside with 2 folds (frames stretched with felt) mounted on a frame.	1	7	4.5	...	90.28	7.75	7.75	
6 Door with one fold (frame stretched with felt) for the latrine, mounted on a frame.	1	7	2.33	...	54.17	4.65	4.65	
7 Window frames outside of 4 squares...	2	1.5	4.75	...	18.06	4.65	9.3	
8 Ditto inside, opening inside	2	1.5	4.75	...	18.06	4.65	9.3	
9 Boxes for frames	2	6.6	5	...	81.25	4.65	9.3	
10 Double small windows with box	1	1	1	...	21.67	4.65	4.65	
11 Hammocks, of a frame stretched with cloth, double felt mattres, cords and hooks at the end for suspension.	9	6.5	2.5	...	252.78	12.4	111.6	
								Weight of wood work 1,898lbs. Price ... 268 Rs.

43	Do. inside with bands of leather and oil painted (in these openings are made corresponding with the doors and windows.)	4	21	8.5	...	221.36	68.51	274.04
44	Partition separating invalid room from the porch, cloth painted with oil	1	7	3	...	4.69	4.93	4.93
45	Ceiling of porch, cloth painted	1	4.5	3	...	2.16	3.10	3.10
46	Partition separating sick room from latrines, cloth painted with oil	1	7	7	...	10.11	11.47	11.47
47	Oil cloth for the walls ceiling and floor of the latrines	...	...	3	...	63.19	...	52.7
48	Ceiling of latrines, cloth painted	1	7	...	0.66	4.69	4.93	4.93
49	Hose with rings of iron inside connecting the lamps to the ventilating funnel (50)	1	14	...	0.66	3.61	6.51	6.51
50	Portable iron chair	...	1	...	...	18.06	38.75	38.75
51	Iron utensil	...	1	...	...	9.03	23.5	23.5
52	Portable ladder to set up the barrack	1	14	...	...	72.22	12.40	12.40
53	Instruments and tools to set up the barrack and spare stock (nails, screws, wire, keys, hammers, &c.)	...	...	...	...	36.11	...	23.5
54	Erecting barrack	...	...	...	...	...	...	77.8
	Total weight of the barrack	...	...	...	...	2½ tons	...	...
	Total price with contingencies	...	...	...	...	...	...	2,500
								Weight of fittings 1,089 lbs. Price of do. ... 1,344 Rs.

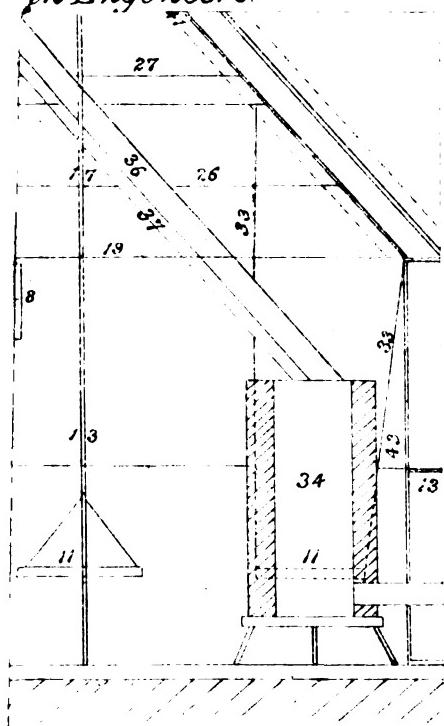
NAMES OF PARTS.	Number.	Feet.		Weight in lbs Avoird.	Rupees.		Remarks.
		Length.	Breadth.		Depth.	Total.	
30 Iron wire stretched vertically between the frames	18 4	9	...	0.01	5.77	0.15	2.70
31 ...	7	...	0.01	1.88	1.08	4.32	
32 Bars of iron to attach windows to the foundation planks to frames of doors and windows, with nuts, &c	224	...	0.01	0.01	1.2639	...	
33 Iron wire from which the beds are suspended with hooks at the ends ...	9	17	...	0.01	5.42	.26	2.34
34 } Iron store with funnel (35) for introducing fresh air	1	5	2.74	1.6	288.89	108.50	
35 ...	21	...	0.66	31.39	18.60	18.60	
36 Chimney with turning cowl	...	...	...	...	...	...
37 Iron gutter below inclined part of chimney ...	1	12	1	...	18.06	6.20	6.20
38 Rods to which are suspended the cloth partitions separating the latrine from the porch and the sick room	1	3	...	0.03	1.08	.39	.39
39 ...	7	...	0.03	2.53	.93	.93	
							Weight lattice work 521 lbs. Price of do. ... 292 Rs.
FELT AND CLOTH.							
40 Felt pieces for roof with bands of leather sewn on	4	13.5	15.5	...	216.67	68.20	272.80
41 Ditto painted in oil	4	13	15	..	234.72	74.40	297.60
42 Felt pieces for wall outside (with bands of leather) one has an entrance cut for the door and another for the window and a third for 2 windows.	4	23	8.5	...	189.58	59.21	236.84

BULANCE
en Engineers.





BULANCE
in Engineers.



UNIVERSITY OF MICHIGAN

3 9615 03610 3871

